IN THIS ISSUE—CLASS A MILITARY TRUCK DETAILS

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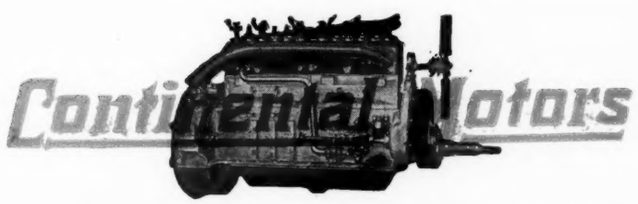


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VOL. XXXVII NEW YORK—THURSDAY, JULY 26, 1917—CHICAGO No. 4

# War Department Takes Over Military Truck Design

## After This Year Only Standardized Trucks To Be Bought—Department To Hire Civilian Engineers—Future Orders To Be on Bids Similar to Warships

By A. Ludlow Clayden

COLUMBUS, OHIO, July 20—The development of the standardized military truck has been taken entirely out of the hands of the Society of Automotive Engineers and the motor truck industry in general, and placed entirely within the War Department. Secretary of War Newton B. Baker has not only so decided, but has already made a large money appropriation to develop standardized type A and type B motor trucks at the fastest possible pace so that these standardized trucks will be ready for next year.

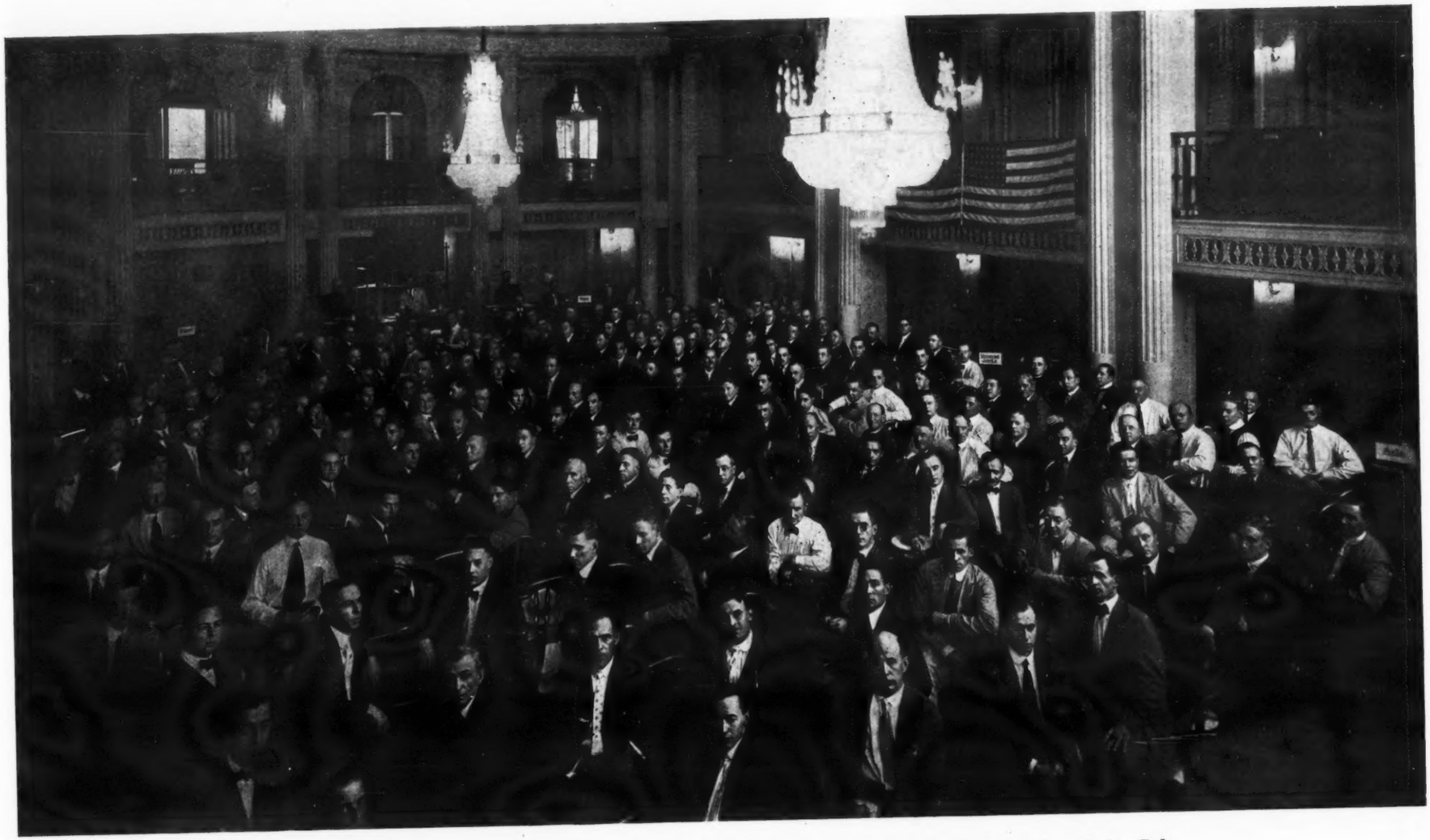
**Army Truck Program Settled**

This message was delivered to over 200 representatives of the motor truck industry assembled here to-day at the call of the War Department. Captain Britton, representing Secretary of War Baker, delivered this message in person and by it apparently has definitely settled the military truck program. Under his direction the two standardized trucks will be developed and standardization carried to the last cotter pin. According to the present plans of the government only these standardized trucks will be purchased for military use after the present year. The War Department is going to hire several of the best motor truck engineers to develop unsettled details of these trucks so that the work will be rushed as speedily as possible. Once the designs of these standardized type A and type B trucks have been settled several will be built and tested to destruction. Many truck engineers will be consulted with regard to detail improvements, and it is expected that the entire engineering ability of the motor truck world will be represented in these standardized trucks. Once the final job is completed the manufacture of them will be undertaken by different truck companies who will bid on definite quantities the same as shipbuilders bid on warships or the same as other manufacturers bid on government necessities.

**Aircraft Board Influence Felt**

Unquestionably the standardizing program of the Aircraft Production Board and the development of a U. S. standardized aviation motor has had much to do with the turn in affairs in connection with the motor trucks. Naturally this announcement by Captain Britton created considerable agitation at the meeting. The opposition to such a plan of standardized motor trucks centered in twelve truck manufacturers who voiced their opposition to such a plan. Windsor T. White (White Co.), as chairman representing these twelve truck manufacturers, called upon G. M. Graham (Pierce-Arrow) to repre-

## Motor Truck Engineers and Parts Manufacturers in Session on Army Truck Details



*OVER 200 engineers and manufacturers of motor trucks and parts gathered in Columbus, Ohio, July 20, for general discussion of the specifications prepared by the Quartermaster's Department for Class A and B military motor trucks. The tables around which the various committees on individual features of design held their discussions can be seen in the background.*

sent the views of these manufacturers—Autocar, Federal, Gramm, General, International, Kelly-Springfield, Locomobile, Nash, Packard, Pierce-Arrow, Reo and Republic.

Mr. Graham argued that these companies had been supplying European Allies with standard trucks as manufactured by the different companies, and repeat orders being received right up to the present indicated that the trucks were giving entire satisfaction; and further, that it was impossible for the War Department to improve upon these designs in a standard series such as the contemplated types A and B.

This defense of the European performance of American trucks was a key-note for Captain Britton in his reply, which was well received by all present and carried conviction. Captain Britton contended that while American trucks had given comparatively good service over the European roads they were now operating on, due to the battle line in France not changing for some years, that when the line would change and the advance come that the roads over which the trucks would have to operate would be immeasurably worse than Mexican conditions and that a specially robust military truck such as contemplated by the department would be necessary. He declared that motor trucks in Europe when the advance on the Western fronts takes place will have to operate over roads that to those in Mexico last summer are as boulevards in comparison.

### Standardized Trucks Essential

A large part of Captain Britton's talk, given in full on another page, was taken up in showing how it will be possible to develop tests and build the standardized trucks in time for their use when required in Europe. He frequently referred to the work of the Aircraft Production Board in developing the standardized aviation motor which automobile manufacturers are accepting as the best solution of the aviation program. Captain Britton considers the standardized motor truck as essential and as possible of attainment in as reasonably short time as the aviation engine.

During the present year the department will purchase standard makes of trucks, but it is anticipated that the present year will see the end of such orders.

The number of modified commercial trucks already ordered is sufficient to meet the needs of the army up to the time the new standardized truck is expected to be ready, but even after this is available in large numbers, the old-line manufacturers will continue to sell their trucks in the form the army is now taking, in such numbers as the department may be justified in buying. In other words, manufacturers of factory-built trucks will not be required to build the new standardized trucks. This would entail tool changes too costly to be carried as a burden on the product of these factories.

### 30,000 to 50,000 Trucks Needed

Major C. B. Drake of the Quartermaster-General's office estimates that that department will purchase within the next year or 18 months from 30,000 to 50,000 trucks. Plans of the department are to use only one type of truck in divisional trains, which consist of approximately 140 cargo-carrying vehicles. Munition trains consist of approximately 400 trucks.

Captain Britton advised manufacturers not to continue individual experimental work in their factories in connection with military trucks. The work is to be entirely carried out in the War Department. Only where factories have something radically new should such factory experimental work be continued. He announced that several times as many

Front row—first from left—Cornelius T. Myers; third, E. W. Sternberg, Sterling Motor Truck Co.; fourth, Capt. W. M. Britton, Engineer of Motor Transport, Quartermaster Corps, U. S. A.; fifth, R. W. Austin, Gramm-Bernstein Motor Truck Co.; sixth, W. T. Norton, Jr., Selden Motor Vehicle Co.; seventh, E. E. Wenp, Denby Motor Truck Co.; back row, first from left, M. P. Winther, Winther Motor Truck Co.; fourth, F. J. Alvin, United States Motor Truck Co.; sixth, B. A. Gramm, Gramm-Bernstein Motor Truck Co.; eighth, F. A. Whitten, General Motors Co.; tenth, L. P. Kalb, Kelly-Springfield Motor Truck Co., Chairman; twelfth, H. D. Shamberg, Clide Cars Co.; thirteenth, Charles Guernsey, Service Motor Truck Co.

A. W. Copland, Detroit Gear & Machine Co., seated second from left to the rear, Chairman. Other members of the committee present were: W. C. Lipe, Brown-Lipe Gear Co.; George C. Carhart, Brown-Lipe Gear Co.; Charles Cotta, Cotta Gear Co.; A. A. Gloetzner, Covert Gear Co.; A. C. Bryan, Durston Gear Co.; W. W. Peck, Munsey Gear Wks.; S. O. White, Warner Gear Co.; R. P. Johnson, Warner Gear Co.; R. M. Bean, Durston Gear Co.; L. J. Campbell and L. L. Campbell, Campbell Transmission Co.; J. C. McIbray, Merchant & Evans Co.

type B trucks would be required as type A, and suggested that the work on the type A's by the War Department would be stopped temporarily and work on type B taken up.

Alvan Macauley (Packard) was certain that Captain Britton's address, which follows herewith, in full, did much to clarify the situation. It is all a question of allowing factories sufficient time in which to manufacture a product.

The morning session concluded the general meeting and the activities of the afternoon were limited to a few minutes before those present divided themselves into various groups to discuss details of design.

The design of the class A and the class B military trucks is to be completed by civilian engineers, drawn from the industry, working in the War Department at Washington and paid by the War Department. The standardizing work already done in the past and at the recent meetings in Washington and Columbus will form the basis for complete standardization.

The work which has been done under the auspices of the S. A. E. at the request of the War Department is now taken over entirely by the department, the S. A. E. ceasing to have any responsibility in the matter. The work of the society is done.

All the work of getting these trucks on the road is to be hastened with the greatest speed. The testing will be night and day work. The first sample vehicles will be running in a matter of weeks if the parts makers can do as well as they anticipate. It will be a long time before the men now drafted are selected and turned into soldiers ready and fit to be sent overseas. By that time the standard truck is to be ready and available in quantities.

# War's Success Demands Standardized Trucks

By Capt. W. M. Britton

SEVERAL speakers, in expressing their views, have laid special stress on the attempt which England made to standardize motor trucks. They are pointing to the glaring danger in attempting to make the same mistakes which England made. England tried to standardize her trucks. She failed ignominiously. This country, in the face of that experience, is figuring on doing the same thing. Why? It would look on the face of it like an unexplainable act, how we could possibly figure on following in the footsteps of a failure which England has acknowledged to have made. If we were working under the same conditions as England was working under, then I say that every man who attempted to do the same thing ought to be taken out and shot, if he is acting in the face of the experience which England is known to have had.

But are we working under the same conditions that England worked under?

We most certainly are *not*. After calling our attention to the fact that England made this terrible mistake of attempting to standardize motor trucks, that gentleman comes right back at us almost in the same breath and states that this attempt was made by amateurs, men who apparently knew nothing about the business.

MR. YOUNGER: Excuse me for interrupting you. That referred to the two trucks built 6 years ago; I did not refer to the trucks mentioned by Mr. Graham, on which two of the most reputable and able engineers in the kingdom worked. One of them was George Watson and another Captain Rainforth, of the Napier company.

CAPTAIN BRITTON: It was also admitted that this attempt to standardize trucks was going to tie up the whole automotive industry or auto-truck industry of England. In other words, if they attempted to put across this standardization it would interfere with the production of those trucks which they were so badly in need

of. That in itself, irrespective of what product they expected to get, would have been a fatal mistake.

On the other hand, they were attempting this standardization after they had acquired thousands upon thousands of other trucks and had them in the field.

They have also called our attention to the fact that England and the other Allies are using ordinary standard commercial trucks, built by the large manufacturers, and that they refuse to have these trucks changed in any way. Why? I want to tell you frankly that that is right. There isn't the least question about the desirability of that procedure. I want to tell you also that it is exactly in line with what we are attempting to do. (Applause.) The real, vital reason why they tell the manufacturers not to change anything is not because they say "these trucks are absolutely what we want; these trucks fulfill our every requirement." Not by any means. They have got these trucks, thousands upon thousands; they have to maintain these trucks; they have to get all the parts to take care of all the repairs; and that is a gigantic task, as everyone realizes who has had anything to do with the maintenance of trucks or anything else connected with the war. They realize that just as soon as any manufacturer makes the least change in any part which is different from his standard, that it at once interferes greatly with their entire program. They are sure to send out parts to various sections of their fronts which will not work, and that procedure would be fatal to their program.

**Must Act Quickly**

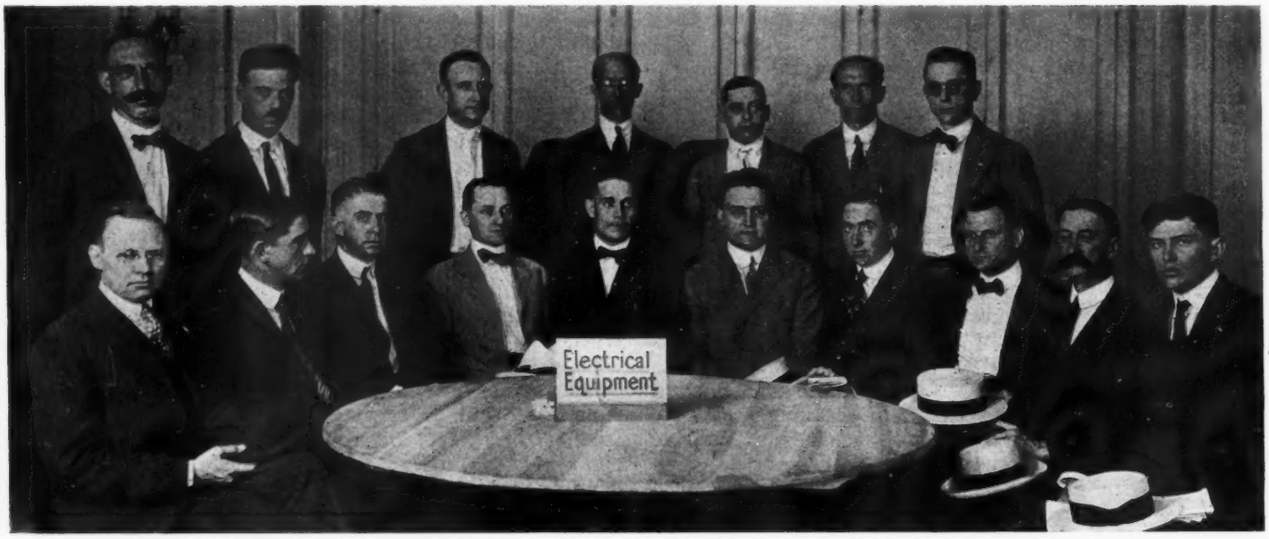
Now, here, what we are attempting to do is exactly the same thing, only what we want to do is to do this thing in the beginning, just as quickly as we possibly can, and not have a dozen different makes of trucks—and they say they have had from twelve to twenty over there, with its attendant gigantic task of replacements; but it is to have one truck, which we will decide upon only after we have had the services of the very best engineers and men connected with motor transportation that are available in this country and in Europe.

It is not contemplated that we will start right in now, make a truck on paper, and say, "That truck looks right. We will build that truck now by the thousands and send them over to Europe to use on the battlefield." Nobody has thought of entertaining such a crazy proposition. We expect to conduct this work in an entirely reasonable way, and in such a way as will be agreed upon by all the various engineers and executives who will consult with us in this matter. We, of course, realize that we must depend upon the standard manufacturers, or the manufacturers of standard commercial trucks for all of our equipment up to the time that we can obtain standardized trucks in quantity, and trucks which we can be sure are right, trucks which are right and that there will be no question about, trucks which we have thoroughly tried, trucks which I admit will be worked night and day. We will not let those trucks rest a minue. We will put loads on those trucks. We will run them over the worst country conditions we can find in the United States, under all sorts of conditions. We will put our engines under non-stop runs. We will do everything possible in this work to further these tests and to make sure that the design is right and that they are constructed properly in every detail to withstand the service which military trucks must withstand.

**Standardization Important**

One gentleman has referred to the fact that this program would interfere seriously with his factory, because of the fact that it might be called upon, probably would be called upon, to produce aviation engines. What kind of aviation engines is he going to produce? What sort of work is being done in order to obtain a proper aviation engine at the present time? They are doing exactly the same thing that we are contemplating doing. So why should they object to doing the same thing for us? They have recognized the fact that the standardization of aeroplanes is an extremely important thing. It is the all-important thing, indeed. They are right in the beginning of their aviation program. We are right in the beginning of our motor truck campaign, our program. They are pushing with feverish haste the standardization of airplanes. They will have airplanes by thousands. These airplanes will be standard. They will be standardized in all parts. They will have one engine. They are getting the very best aviation talent this country affords to design these airplanes, the engines and all their component parts. They are not going to use these airplanes or these motors until they have been thoroughly tested.

Left to right—Walter Strom, U. S. Ball Bearing Co.; C. R. Mabley, S. K. F. Ball Bearing Co.; G. C. McKey, S. K. F. Ball Bearing Co.; R. E. Wells, Hyatt Roller Bearing Co.; George R. Bott, Norma Co. of America; F. G. Hughes, New Departure Mfg. Co., Chairman; R. E. Clingan, Hess-Bright Mfg. Co.; F. W. Marschner, New Departure Mfg. Co.; T. V. Buckwalter, Timken Bearing Co.; Otto Bruenauer, U. S. Ball Bearing Co.; J. T. R. Bell, Gurney Ball Bearing Co.; Howard L. Spohn, U. S. Ball Bearing Co.




Front row, second from left—Francis R. Hoyt, Menominee Electric Products Co.; third, G. R. Cook, Willard Storage Battery Co.; fourth, A. H. Timmerman, Wagner Electric Mfg. Co.; sixth, G. H. Lewis, Westinghouse Elec. & Mfg. Co., temporary chairman; seventh, V. Bendix, Eclipse Machine Co.; eighth, A. D. T. Libby, Splitdorf Electrical Co.; ninth, Wm. J. Hart, Splitdorf Electrical Co.; tenth, C. E. Wilson, Westinghouse Electrical Mfg. Co. Back row, first from left—Joseph Bijur, Bijur Motor Lighting Co.; second, L. M. Woolson, Bijur Motor & Lighting Co.; fourth, O. L. Harrison, Dayton Engineering Laboratories Co.; sixth, J. M. Hipple, Westinghouse Electrical Co. Other members present were: C. E. Stahl, Bosch Magneto Co.; F. W. Edwards, Dayton Engineering Laboratories Co.; W. A. Bell, Hall Lamp Co.; W. H. Hutchins, North East Elec. Co.; W. O. Dady, Pfanstiehl Co.; F. C. Kroeger, Prest-O-Lite Co.; G. McMahon, Remy Electric Co.; F. S. Armstrong, Vesta Accumulator Co.; R. J. Nightingale, Willard Storage Battery Co.; Sanford Brown, Condensite Co. of America; Fay Beal, Kokomo Electric Co.; C. E. Banta, Adams & Westlake Co.; I. H. Teagle, Teagle Co.

They are employing engineers who understand aviation, who have built aviation engines. Those men are designing an aviation engine which in their opinion is the best engine that has been produced up to the present time for war purposes. They have been confronted with a lot of problems which have not yet been solved. Those problems will not be encountered in the design of motor trucks. Motor trucks have been used successfully for years, and there are no big problems which have not been overcome.

**Trucks and Airplanes Needed Simultaneously**

When are they going to get these airplanes? You say when are we going to get these motor trucks? We are going to need motor trucks at the same time they need airplanes. They have got to have the motor trucks when they get the airplanes. If we have to start out now and design a complete motor truck from stem to stern, are we at any disadvantage compared with the standardization of these airplanes? I tell you we are at a decided advantage, compared with their program. We are not going to do that. We are not going to put a lot of experimental devices in this motor truck. We are going to use those devices which have been thoroughly proven out and which you engineers know to be right. You will say, "I know it is right, because I have been using it for years. There is no experiment about it."

They are drafting the men to-day for this Continental army. I believe one great peace advocate said we could raise 1,000,000 men from sundown to sunup. We can. To-day will prove that. But they are 1,000,000 *men*. They are not 1,000,000 *soldiers*. It takes a long period of time to properly train soldiers. It takes a long period of time to get all the various intricate equipment which must go with those soldiers. It is going to take a long period of time to get the shipping equipment which will transport those soldiers and supplies over to the other side. When are they going to get their men there? When are they going to get their supplies over there? After they get all of their supplies and all of their men over there, when are you going to need motor trucks? Are you going to take these men over there immediately to the front, so far from railhead that you must immediately have large motor transportation facilities? Certainly not. Those men have got to get on their feet. They have to be trained on the ground. Undoubtedly they will be put in encampments, the most reasonable thing in the world. And you would not put those encampments or cantonments away off from railhead, would you? Certainly not. Those encampments will be right around railheads where supplies can be gotten by the shortest route. It will take a few motor trucks no doubt to transport those supplies from the railhead to the encampment, right around there. But when are you going to require these trucks? You are not going to use them until the men are at the front, where you have to truck these supplies from the railhead to the men. That is when you are going to need them. Then, I say, Why must we insist on getting all of these trucks immediately? There doesn't seem to be any real reason for it.

**Emergency Action Now**

But, as I said, in every military emergency you will always do what you must do. We will always obtain the standard commercial trucks whenever it is necessary to get them. But we are going to push with all the haste possible the standardization of these trucks, so that they will be complete and have been tried and thoroughly proven at the earliest possible moment. It will be months before they have thoroughly tested, tried and proven their airplanes, and have them produced in quantity and have them transported to Europe. And they need them both at the same time. (Applause).

Another point which might be pertinent to speak of is the trucks which the Allies are using—the make and type of trucks which they are using and which they are insisting upon continuing to use. They are continuing to use these trucks, you say, for the simple reason that they are right for their service; they have been found to

meet every requirement. Of course, that is not the reason. They in the beginning had to get trucks. Every one knows what the program was in 1914, and since that time. They had to buy these trucks, all the trucks they could put their hands on. They had to go to the largest manufacturers of trucks and take all they could possibly get of them. They needed trucks. "No, we can't wait until you standardize something, and get something that would be a little better for our use. We have to have them now; we want them quickly; give us anything you have got; we want to go to the large manufacturers so as to eliminate the number of makes as far as possible, but we must have the trucks." They have obtained those trucks. They can't possibly go back. They must keep on using those same trucks that have up to the present time fulfilled their requirements in a fairly satisfactory manner. But the real reason why they have to stay with those trucks is because they have already obtained them in large quantities, and cannot go to other makes; they cannot go to changes in these same trucks because of the extremely difficult problem of maintaining these trucks and securing proper parts for them.

Members of the Engine Cooling Committee present were: J. W. Harris, Chairman; R. B. Weeks, Sparks-Withington Co.; George J. Holz, Holz Foundry & Mfg. Co.; George A. White, Sparks-Withington Co.; W. Messinger, Standard Roller Bearing Co.; W. H. Oakes, Oakes Co.; W. I. McAllister, Pitter Fan Co.

A very large number of manufacturers and several of the old-line manufacturers have agreed to furnish us these trucks, which are very closely in conformity to our specification requirements, in from 4 to 6 months. I think that tells a big story. That shows what they can do. One very prominent truck manufacturer, or engineer, rather, I will say, designed a truck especially to comply with these specification requirements.

At first, when some of the engineers read these specifications, they believed they were somewhat imaginary and idealistic, and nothing that was really desirable; they had never built anything like that, and they didn't see any necessity for making them; they had always been getting away very well with their old truck, selling them for commercial use. They built one of these trucks as closely as they could, went to a good deal of expense to get it. He took it out and tried it, and said that he was perfectly surprised at the performance of that truck. He said he had no idea that that truck would be such a performer.

Just another point we should keep in mind which has specific relation to the performance which they have obtained with the standard commercial trucks in Europe: They have been buying entirely, I guess we may say, the ordinary standard commercial trucks. They have found these trucks to be fairly satisfactory. In other words, they have performed at least in a fairly satisfactory manner the duty which was required of them. But are we going to continue to operate under the same conditions as we have been operating under for about 3 years? These trucks had to operate over the comparatively good roads back of the line. Why, *of course*, the ordinary commercial truck would run over those roads. How could it help it? They have had thousands of men back of the lines making these roads, maintaining these lines of communication, right up to the front, or back of the front a short distance, where the regimental wagon trains had to pick up the supplies and carry them over the torn and shell-infested regions. Are we going to continue to operate under the same conditions? Is that front going to remain where it is now for all time to come? (Cries of "No, no!") I tell you, gentlemen, it is not. We are going forward. We must go forward, or else we are not going over there. And when we do go forward, we will be going over the most terrible country the world has ever known.

You say these specifications were gotten up because of the deplorable conditions we found in Mexico. We found that the ordinary commercial truck did not get along there. Another thing that is very pertinent: We had some trucks there which were the ordinary standard commercial truck. There was one make in particular which has been furnished by the thousands to Europe and which has been found to be thoroughly successful, because they are continuing to buy them. I want to tell you that that truck was a positive failure in Mexico. It would not go anywhere. It could not be depended upon.

Now, I want to ask you how many thousands of lives are we going to lose if we buy this same truck and put it in our service when we have to go forward in Europe? We will find conditions there which will make the roads in Mexico look like boulevards. Then, if we buy this truck,

Members of this Committee present were: H. M. Denjes, Jackson-Church-Wilcox Co., Chairman; J. W. Graham, C. S. Steering Gear Co.; I. D. Shaw, Cincinnati Ball Crank Co.; W. M. Osborne, Gemmer Mfg. Co.; T. R. Johnson, Jackson-Church-Wilcox Co.; George A. Streicher, Lavine Gear Co.; E. A. Ross, Ross Gear & Tool Co.

and put it in that service simply because it has made good over these good lines which have been maintained back of the front and we try to go forward and find we cannot, and we get thousands of our men killed, because we depended upon something which was designed for good roads, simply because it had been done, what are they going to say to us then? They will say, "Why didn't you realize we were going to go up against conditions which had not been met before? Why didn't you furnish us with trucks which had exceptional going ability, which were designed at least for conditions in Mexico, which conditions could not have been approached here?" What will they say to us then about the loss of these thousands of lives, simply because of our plain neglect to do something which was very evident? We are not going to have that kind of truck. We are going to have trucks with the very maximum of going ability. And when we need to go forward, I admit that the railhead will be advanced as far as it can, but there will be the continued use for trucks of the very maximum of going ability, to get these supplies to the men at the front.

**Trucks Will Count at the Front**

Now, we are going just as soon as we possibly can, to obtain trucks which all engineers in this country will admit are right for our service; and then, when the time comes to get our men to the front and we make our drive, we will be prepared; for we are going to drive the Germans out of those trenches; we are going to drive them right back into Berlin; and we are not going to depend on any of your commercial trucks to do it. (Long continued applause).

MR. LUDLUM: May I ask one question to clarify this situation? You stated you are not going to require these trucks in a hurry. Some of us executives, when we got the bids last May, in reading the bids we thought you required 26,000 trucks between July 1 this year and July 1 next. Can you help us on that point, where we have to purchase merchandise so far ahead and do our planning? This is July 20. Are you not going to require those trucks in that time, as that bid indicated?

CAPTAIN BRITTON: There is, of course, a question as to the total number of trucks that will be required. Present estimates are based, of course, upon the present military program, no doubt, which I believe is on about 2,000,000 men, from 30,000 to 50,000 motor trucks. I think we may well depend upon it that when we get started 1,000,000 men is not going to start to tell the story, but rather that we will double or treble that number. I know nothing definitely about this; I am simply expressing a personal opinion. But it is evident that we are going to require many thousands of motor trucks. There will be a sufficient number of trucks to more than justify some of the large manufacturers in completely tooling up for the manufacture of this standardized truck when it has finally been decided upon. That is a pertinent question. They must know that there will be enough trucks required to justify them in making the very large expenditure necessary to produce all the tools, jigs, fixtures and other machines to produce these trucks in quantity. There will not be any question about that, I am sure, as to the desirability of furnishing all of that equipment necessary to produce their trucks. But, of course, the first thing we must decide upon is what the trucks will do. We will have to buy the ordinary standard commercial truck which will most nearly meet our specification requirements up to the time when we can obtain these standardized trucks, which we will admit and which all of the rest of the automotive industry will admit are absolutely right for military service.

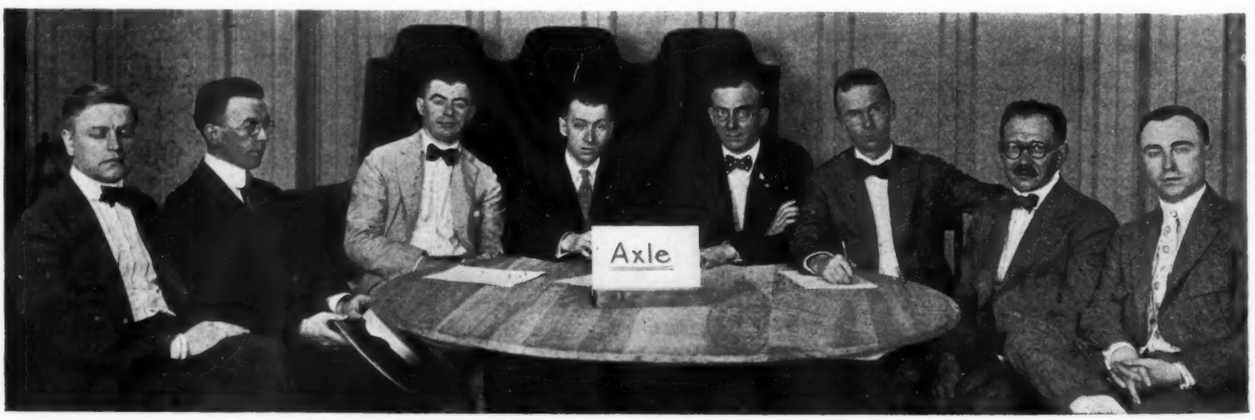
MR. BROUSSEAU: I am interested in the remark you have just made, that, in your opinion, you believe that the manufacturers of what is known as the present commercial truck would be justified in tooling up and complying in every respect with the recommendations of this society, this board that you will appoint to design the truck.

CAPTAIN BRITTON: Yes.

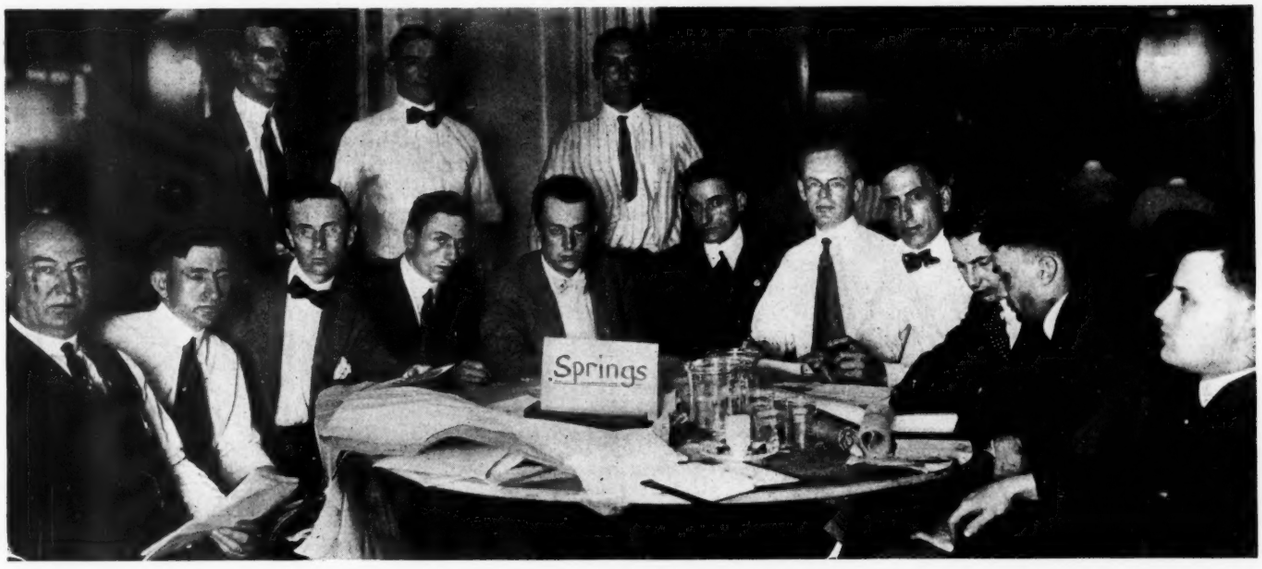
MR. BROUSSEAU: It will cost the average manufacturer $100,000; supposing that all or half the manufacturers did that, went ahead with the idea that the Government would need enough trucks to give everybody who had tooled up enough business to pay for those tools. Do you think the manufacturer would be justified in going ahead with this expense for tooling without having some idea at least of whether the Government intended to give him some business?

CAPTAIN BRITTON: No, I do not think he would be justified in doing that at all. I think that the proper program would be this: We want to co-operate with all of you to the limit. We want every bit of help you can give us.

The first thing that is to come up is our designs to see what this truck should be, based on our own experience and on yours. Let us get the design up just as completely as possible, and all agree on that design. Then let us go to any expense that is necessary to produce a number of those models, a number of those engines, a number of those trucks, not to make the dies and all the tools necessary to produce these trucks, but to make them like you




Second from left—A. M. Laycock, Sheldon Spring & Axle Co.; third, R. J. Burrows, Clark Equipment Co.; fourth, G. W. Carlson, Timken-Detroit Axle Co., Chairman; sixth, W. C. Keyes, Standard Parts Co.; seventh, R. H. Rosenberg, Adams Axle Co. Other members present were: R. E. Fries, Columbia Axle Co.; C. H. Gleason, Kalamazoo Spring & Axle Co.; R. A. Schaaf, Sheldon Spring & Axle Co.; B. V. Torbensen, Torbensen Axle Co.




Front row, left—C. H. Gleason, Kalamazoo Spring & Axle Co. Third from left, front row—W. C. Keys, Standard Parts Co. Fifth from left, front row—C. W. McKinley, Willys-Overland Co., Chairman. Third from left, back row—M. P. Rumney, Detroit Steel Products Co. Seventh from left—W. M. Newkirk, William & Harvey Rowland Co. Other members of the committee present were: W. E. Dunston, and R. A. Townsend, Perfection Spring Co.; P. A. Hopkins, Penn Spring Co.; M. N. Hendrickson, Mather Spring Co.; R. E. Russell, Detroit Steel Products Co.

build a house. Let us get them out and thoroughly try them out, and eliminate all those details which we know come up under service, and *then*, as soon as we have got that thoroughly threshed out, we can then in the meantime get you all together; we can then possibly by that time have a little clearer idea about the requirements which are going to obtain; we will get you together. Now, who is most able under present commercial conditions to go into the manufacture of those trucks? Who do you think would be justified in putting in the necessary machinery to produce this truck? We do not say everybody must jump into this work and put in tools for the production of the truck, irrespective of agreement. That would be fatal, because you would have a dozen manufacturers tooling up for the production of some particular unit, and you would completely over-tool yourselves. We do not want that. We want you to get together and decide who best can produce these to advantage and who can best put in the complete tool equipment to produce these and reasonably absorb the expense of the tooling in the production, and that must be done after a conference of the executives.

MR. BROUSSEAU: I understand the plan is that the units will be interchangeable, locating surfaces and things like that; is it also your intention, or do you expect that the parts of these units entering into the units also will be interchangeable?

CAPTAIN BRITTON: That is the program. The real program is to carry this standardization to the limit, the final limit; get each of these units. For example the gearset manufacturers or committee on gearsets have agreed on a gearset which they will manufacture and which will be interchangeable in every one of its parts. We want to carry that same program through every individual unit in this truck. That is the most desirable thing. If we find it impossible to do that all the way through up to the time we can get a reasonable quantity when we need them, we might leave one unit out for a few of these things, and make it interchangeable, and then keep on working and finally standardize it as closely as possible; get that worked out; if it requires additional tests, make them and determine what is needed; in the meantime use tried and proven units in that assembly until you can get those that are thoroughly standardized.

Here is the program: Get these committees together and arrive at a tentative line-up or lay-out for the whole thing, a tentative design on all of these units, along which lines these committees are specialists, to get this all on paper just as quickly as possible. When that is done, it will be desirable to get the consultation of the best engineers to go over these plans, to make suggestions regarding their modifications, go through them from start to finish, make any suggestions regarding any changes which may come to mind; and, if they appear plausible, make those changes; and finally arrive at a design on which they will be agreed as the proper thing, and to incorporate in those designs only those features of construction, only those factors of safety and strength of parts all the way through which they have known to be right.

# War Department's Truck Needs

By Major C. B. Drake

I WILL try to tell you the ideas of the Quartermaster General's office as it now exists. Our office is charged with the supply of motor transportation for the Quartermaster's corps, the ordnance department in so far as they can use material that conforms to our requirements, to the signal corps and to the artillery and the medical service. We have adopted as our standard for motor transportation the 1.5 and the 3-ton trucks. That is type A and type B. When motor transportation of other kinds is required it is generally purchased by the department for which it is needed. The estimates, which have been presented to the office, show that we will probably need within the next year or 18 months possibly 30,000 to 50,000 trucks. No one, two or three companies can furnish this number. So we have limited our orders to date to those manufacturing firms that are able to produce a

truck that conforms most closely to our specifications in order to get the number that will be required for the present emergency. In the meantime we are waiting for the action of the Society of Automotive Engineers as shown by a letter that was presented to them on June 21, I think it was, with reference to the standardization of parts so that they will be interchangeable.

In no case do we intend to supply divisional trains with more than one type of truck. Our divisional trains consist of approximately 140 cargo or carrying trucks. The munition trains consist of approximately 400 trucks. Those are provided by the ordnance department, and they intend to use, as far as practicable, the four-wheel drive. At least, that seems to be their policy at the present time.

Until action can be taken on the further standardization of trucks, so that all parts can be interchangeable, the orders that will be placed will be for trucks of standard manufacture, requiring no compliance with the requirements with reference to which large firms bid upon to conform to our specifications as to Class A and Class B type. The whole subject of the standardization of parts was presented to the Secretary of War and received his approval just a few days ago and an appropriation was made of a large amount of money so that the government will proceed with the standardization and manufacture of these trucks. We hope that a committee of engineers will be appointed to help the War Department and propose to give them a salary so that their services will not be tendered gratis, and also to provide for their accommodation while they are working upon this proposition. We hope that in this way we may be able to get quick action in regard to the standardization of the trucks. If there is anything I have not covered, I would be glad to explain if questions are asked. (Applause).

# Twelve Makers Oppose Standardized Trucks

G. M. GRAHAM said that the object of these concerns was to provide the nation with all the assistance in their power, they were anxious to do all they could for the War Department, but they saw danger in the standardization scheme. They were afraid it might restrict production and so bring about a situation where the requirements of the army exceeded the ability of the industry to supply. He spoke at great length on the satisfactory nature of the work which the commercial models of American trucks had done with the allied armies in Europe, saying that the fact that foreign governments were asking for repetition absolutely without the smallest change was proof that the trucks were right.

He cited the unfortunate experiment in England when in 1915 a most accomplished pair of engineers, acting for the ministry of munitions, designed a standard truck which it was planned to make in all the British truck factories. The result of the effort was to tie up the plants in new and experimental work to the detriment of their output, so that the experiment had to be abandoned.

He said that the length of time to produce a completely new truck was variously estimated at from one year to 2½ years, eight months going for the preparation of jigs, tools and fixtures, and he mentioned the overburdened state of the tool trade at present.

He asked that the manufacturers be allowed to go on building trucks which they knew were satisfactory in Europe, and that if the standardized design idea was proceeded with, it be regarded as being something for the fairly far distant future.

Alvan McCauley, Packard Motor Car Co., contended that manufacturers were to be called upon to produce aviation engines of standardized design as well as trucks, and said that the entire tooling capacity of the Packard factory would be taken up for months in preparation for this engine.

Jackson, Willys-Overland, understood that only about 10 per cent of the truck industry was able to produce at all the type of truck required, and that the governmental effort was to mobilize the other 90 per cent to enable their energies to be used.

Heller, Dart Motor Truck Co., did not think the time required to produce the standard truck need be more than a few months. He thought the co-operation of the parts makers had not been fully appreciated by previous speakers.

There was a little further discussion of similar sort, showing that the opinions expressed by Mr. Graham were by no means generally shared and then Major Drake in response to request gave the Government's view.

## Companies and Representatives at Columbus Meeting July 20

Acason Motor Truck Co., H. W. Acason, R. G. Shuert.
Adams Axle Co., R. D. Rosenberg.
Adams-Westlake Co., C. E. Banta.
American Die & Tool Co., D. Sternberg.
Atterbury Motor Car Co., J. R. Spraker.
Autocar Co., David S. Ludlow.
Automotive Committee Council Natl. Defense, K. W. Zimmerscheid.
THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES, A. Ludlow Clayden.
Bethlehem Motors Corp., L. K. Gordon.
Bijur Motor Lighting Co., Jos. Bijur, L. M. Woolson.
Blood Bros. Machine Co., R. R. Potter.
Bound Brook Oil-less Bearing Co., H. J. Lindsay, W. J. Jennings.
Brown Co., H. W. Brown.
Brown-Lipe Gear Co., W. C. Lipe, George C. Carhart.
Buda Co., R. J. Broege.
Campbell Transmission Co., L. J. Campbell, L. L. Campbell.
Chalmers Motor Co., J. M. Jerome.
Clark Equipment Co., R. J. Burrows.
Clyde Cars Co., H. D. Shamberg, W. W. Wells.
Columbia Axle Co., R. E. Friar.
Commercial Eng. Laboratory, Claude E. Fox.
Commercial Vehicle, Jos. Husson.
Condensite Co. of America, Sanford Brown.
Connecticut Telephone & Elec. Co., C. E. Stahl.
Consulting Engineer, Cornelius T. Myers.
Continental Motors Co., R. A. Weinhardt.
Cotta Gear Co., Charles Cotta.
Covert Gear Co., Alvin A. Gloetzner.
Cunningham, Son & Co., Jas., V. A. Lacey.
Dart Motor Truck Co., C. W. Hellen, W. H. Johnson.
Dayton Engineering Lab. Co., O. L. Harrison, F. S. Edwards.
Denby Motor Truck Co., E. E. Wemp.
Denneen Motor Co., F. S. Denneen, C. N. Mitchell.
A. J. Detlaff Co., H. L. Worbois, A. J. Detlaff, C. M. Carunibach.
Detroit Gear & Machine Co., Alex. W. Copland.
Detroit Steel Products Co., R. E. Bissell.
Detroit Truck Co., Carl F. Jeffries.
Detroit Wyandotte Motor Truck Co., George A. Horner.
Diamond T. Motor Car Co., D. W. Jones.
Ditwiler Mfg. Co., L. M. Liggett, H. F. Lee.
Dorris Motor Car Co. Prev., W. R. Colcord.
Dorris Motor Car Co. V. P., G. P. Dorris.
Durston Gear Co., R. M. Bean, A. C. Bryan.
Falls Motor Co., R. W. Randell.
Federal Motor Truck Co., B. F. Wright, M. S. Pulcher.
Firestone Tire & Rubber Co., E. W. Be Saw.
Frasse & Co., Peter A., John R. Cautley.
Fulton Co., J. V. Giesler.
G. & O. Mfg. Co. Radiators, E. G. Edwards.
Garford Motor Truck Co., E. A. Williams, Jr., S. M. Williams, J. A. Kraus, B. M. Price.
General Motors Co., F. A. Whitten, W. L. Say.
Geuder, Paeschke & Frey Co., H. B. Walker.
Goodrich Co., B. F., T. A. Aspell.
Gramm-Bernstein Co., R. W. Austin.
Gurney B. B. Co., J. T. R. Bell.
Hall Lamp Co., C. M., W. A. Bell.
Hercules Motor Mfg. Co., Charles Balough.
Hess-Bright Mfg. Co., R. E. Clingan.
Hinckley Motors Co., C. C. Hinckley.
Hoosier Auto Parts Co., F. J. Lesh, C. G. Wood.
Hotz Foundry & Mfg. Co., Geo. J. Hotz.
Houghton Motor Car Co., S. S. White, E. M. Houghton.
Hurlburt Motor Truck Co., William F. Legg, P. W. Walke.
Hyatt Roller Bearing Co., Rex E. Wells.
Indiana Truck Corp., M. S. Kerr.
International Motor Co., D. C. Fenner, A. J. Brousseau.
Jacox Steering Gear Co., H. M. Denyes, T. R. Johnson.
Kalamazoo Spring & Axle Co., C. H. Gleason.
Kelly-Springfield Motor Truck Co., Jas. L. Geddes, C. J. Gardner.
Kissell Motor Car Co., H. Palmer, T. R. Johnson.
Kokomo Electric Co., Fay Beal.
La France Motor Truck Co., R. Ward La France.
Lavine Co., G. A. Steicher.
Lippard-Stewart Co., C. A. Pettersen, J. C. Miller.
Major Quartermaster Corps, C. B. Drake.
Mather Spring Co., N. G. Hendrickson.
McCord Mfg. Co., J. D. Harris.
Mechanics Machine Co., E. S. Ekstrom, C. E. Swenson.
Menominee Electric Prod. Co., F. R. Hoyt.
Merchant & Evans, J. C. McIlroy.
Meteor Motor Car Co., Maurice Wolfe.
Moon Motor Car Co., Geo. F. Heising.
Moreland Truck Co., Watt L. Moreland.
Muncie Gear Works, Wm. W. Peck.
Muncie Wheel Co., H. B. Bannister.
Muskegon Engine Co., Irvin P. Miller.

(*Continued on page* 174)

# Class B Army Truck Nearly Standardized

## Layout Drawings of Military Vehicle Transmission To Be Completed This Week—Other Details Rapidly Being Settled

WORK on the class B military motor truck, in accordance with the new scheme which will have it standardized down to the last cotter pin, made good progress at the meetings held at Columbus during the afternoon of July 20 and on July 21. As in the case of the class A, the transmission is the most advanced. It is expected that layout drawings will be completed by the end of the present week. It is to be a gearset with the two shafts arranged horizontally, and the bearing makers have been able to recommend sizes which will allow all makes of ball bearings to interchange and also Timken roller bearings. There is some question as to what to do for the spigot or pilot bearing. Hyatt can make a special bearing to interchange with a ball bearing, but it may prove better to standardize the usual Hyatt type for this point.

**Engine Is Largest Task**

The engine is, naturally, the biggest task. So far the following points are agreed upon:

Detachable cylinder head.
Full forced feed oiling.
Trunnion mounting at front end of engine, two arms to frame at rear.
Intake manifold with "hot spot" exhaust heated.
Standard bell housing bolt ring for clutch housing.
Piston pin bearing in rod.
Thirty per cent Tungsten steel valves.
Water jacketed valve guide.
Roller push rod.
Check valve on breather.
Governor not to be new design, but one of two patented governors to be used.
Push rod guide separate part, individually removable.
Oil capacity 2½ to 2¾ gal.

Debatable points are:

Block or pair cylinder casting.
Aluminum or iron crankcase.
Bore and stroke.

It has been agreed that twelve of the motor builders' engineers will meet in Washington July 26 to continue the work, and they will enlist the assistance of the representatives of the British and French transport services who are there to give advice. H. L. Horning, chairman of the engine division, in giving the report, said he hoped the first engine might be running early in August. The motor builders would be able to care for the government's requirements fully. Probably each would make complete engines, but that was not decided, probably also no builder would attempt to produce both a class A and a class B engine.

**Opinions Differ on Ignition**

The discussion drifted on to ignition and here the electrical equipment committee are very much divided. There was a good deal of talk out of which it appears to be the general feeling that for the type called for in the specifications two spark plugs to each cylinder were advisable. This would mean a complete magneto and a complete battery ignition system with timer driven off the engine, a change-over switch giving either magneto or battery, neither of them, or both of them. Such a switch is a simple low-tension affair and sooting up of the plugs on the system not in use, which is a common failing of double systems, could be overcome by running normally on both.

**Spring Specifications Completed**

The springs have been specified completely, but there is still argument as to whether the front spring should be evenly divided or have the front end shorter by 1 in. than the rear end. The spring makers believe the uneven division best, but it is said that a mistake made in the field in replacing a spring would perhaps be serious. It seems likely that the uneven division will win the day, but a change is possible.

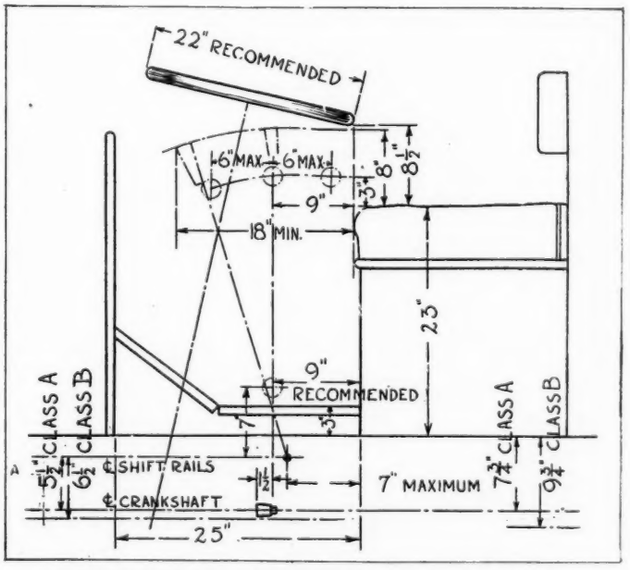
For the frame a 9-in. channel 4 in. wide is settled upon, carbon steel and not heat treated.

The steering gear will be placed behind the engine arm and the clutch and brake pedals will be mounted on the steering gear case, this giving maximum accessibility to both the clutch and the transmission.

For axles a worm design and also an internal gear will be prepared and both types tried out. Probably a double reduction design will also be made.

**Many Volunteer To Aid**

From each of the different committees Captain Britton obtained a list of the men who would be prepared to go to Washington for either whole or part time till the design is completed. He took a lengthy list of volunteers and will call such of them as he desires. Probably the size of the committees will be reduced greatly, as they are too big for detail work.




Suggested standard control layout for standard military Class B truck

# Ordnance Department Truck Specifications

## Instructions to Bidders on 3-Ton and 2-Ton Gasoline Motor Trucks with Four Wheel Drive

COMPLETE specifications for 3-ton and 2-ton gasoline motor trucks with four-wheel drive have been issued by the Ordnance Department in Washington. These specifications follow very closely those prescribed by the Quartermaster's Department, published in THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES for April 19, so that only the paragraphs which differ from the Quartermaster's specifications are published herewith.

The following specifications apply to 3-ton trucks only. Paragraphs which differ from the Quartermaster's specifications for 2-ton trucks appear at the end of the 3-ton specifications, under a separate heading.

### INSTRUCTIONS TO BIDDERS

1. The trucks or other articles for which proposals are invited must conform in quality, material, workmanship, and dimensions to the specifications and drawings furnished by the Ordnance Department.

2. Bidders will state a price for each truck or other article and the time within which it will be delivered. In fixing the date or dates of delivery for material in the contract, time will be computed from the date of receipt by the contractor of notification of award.

3. Copies of the advertisement, of these instructions to bidders and general specifications, of the special specifications, and of the drawings must accompany and form part of the proposals, which must be submitted in duplicate.

4. The right is reserved to waive informalities and to reject any or all bids or parts thereof, or to change the number of trucks or other articles to be awarded to any bidder, or to make separate awards on different items, if deemed for the public interest.

5. A bidder who is not a manufacturer of the material advertised for must state the name of the maker of each article he proposes to supply, unless it be manifestly impracticable to furnish this information.

Lack of commercial standing on the part of a bidder, or inadequate facilities or plant on the part of a manufacturer, will constitute good and sufficient grounds for the rejection of bids.

All bids received from parties who have failed unjustifiably to fulfill former contracts with the United States will be rejected.

Careful investigation will be made of the financial status of individual bondsmen offering themselves as sureties on contractor's bonds, and no bonds of inviduals will be accepted until it is conclusively shown to the satisfaction of the contracting officer that such bonds afford ample security to the United States for the fulfillment of the undertaking in question.

6. Payment for all material will be made on delivery on certificates approved by the proper officers of the Ordnance Department and in the manner prescribed by law.

7. Within 10 days after receiving the blank forms the bidder to whom the award is made must execute a contract in quintriplicate, with good and sufficient sureties, for the faithful performance thereof.

8. Contracts will contain the following provisions:

(a) The United States reserves the right to order additional supplies under the contract, not to exceed twenty (20) per cent in each case, of the quantities contracted for, at the same prices and to be delivered at the date or dates fixed by the contracting officer, under appropriations made at the date of the contract, or to accept, with consent of the contractor, at the same prices in full satisfaction of the contract, such lesser quantities of the supplies herein contracted for, not less than eighty (80) per cent in each case, as in the opinion of the contracting officer shall best accord with the public interest. The provisions of the contract in regard to liquidated damages will apply to the delivery of any additional orders given under this article.

(b) All material furnished under the contract shall be at all times subject to inspection by the proper officers of the Ordnance Department, United States Army; and whatever material furnished which does not in all respects fulfill the requirements of the contract shall be rejected, and the decision of the inspecting officer as to the quantity and quality of the material furnished shall be binding. The contractor will be required to replace all material so rejected.

(c) The Chief of Ordnance, United States Army, may make changes in the drawings forming part of the contract, and if such changes involve extra labor and material, a fair price will be paid therefor; but if such changes involve less labor and material, a fair deduction will be made from the contract prices. No claim for addition or deduction on account of such changes will be made unless the same have been ordered in writing. The contractor shall, if requested, furnish promptly a detailed statement of the estimate cost of such changes and the estimated delays caused thereby.

(d) In the event of the failure of the contractor to prosecute properly at any time the manufacture of the material herein contracted for, or to complete the delivery at the date or dates stipulated in article 1 of the contract, the Chief of Ordnance, United States Army, may, after notification in writing, proceed at the expense of the contractor to complete the manufacture or delivery of the material contracted for or any part thereof, in such a manner as he may deem best for the interests of the public service, charging to the contractor any excess of cost over the contract price resulting from such action.

(e) No person or persons shall be employed in the performance of the contract who are undergoing sentences of imprisonment at hard labor which have been imposed by the courts of the several States, Territories, or municipalities having criminal jurisdiction.

9. No contractor having in hand work of a military character which the War Department may designate as confidential shall permit a foreign officer, or other foreigner not in his employ, to visit portions of the plant where such work is in progress, nor shall he give to such person any specific information concerning such work without the authority of the Chief of Ordnance; nor shall any alien in his employ be engaged on, or be permitted to examine, such parts of the work as the department may specially designate as confidential. The contractor must notify the inspector in charge of the work at his establishment of expected visits in order that the inspector may accompany the foreigner during his visits whenever practicable. A violation of these requirements will constitute sufficient cause for refusal by the department to consider proposals by the contractor for future work of a confidential character.

10. To guard against premature opening and insure their reaching the proper officer, envelopes containing proposals should be marked and addressed as prescribed in the advertisement.

(*Paragraphs 16 and 17 of Quartermaster's Specifications omitted.*)

27. LOAD CAPACITY: Trucks must be of sufficient strength, and provided with sufficient power, to carry and propel the following gross loads under the most severe service conditions:

| | |
|---|---|
| Pay load | 6000 lbs. |
| Body | 1075 lbs. |
| Three men | 525 lbs. |
| Extra equipment | 200 lbs. |
| Total | 7800 lbs. |

28. LOAD DISTRIBUTION: The distribution of load between front and rear axles, with the normal pay load equally distributed in the standard truck bodies herein specified, shall be as equally divided as possible between the front and rear wheels.

29. WEIGHT OF CHASSIS: The maximum weight of chassis, without body or extra tool and parts equipment, and without gasoline, water or oil, must be not more than 7500 pounds. A definite statement must be made showing exactly what equipment is included in the stated weight.

30. ROAD SPEED: The governor on engine shall be set so as to give a road speed of 15 miles per hour, with a maximum governed engine piston speed of 1300 feet per minute.

34. WHEELBASE: The wheelbase must be suitable for the use of a 10-ft. body, and shall be not less than 116 in. nor more than 140 in.

35. TURNING CIRCLE: The truck shall be so designed as to turn in a circle of not more than 50 ft., diameter measured from outside wheel tracks. Positive stops must be provided to limit the steering angle of the steering wheels.

36. GAGE: The gage of the wheels, measured from center to center of felloe bands, shall be preferably 60½ in.; with 7-in. single tires 56-in. may be used.

## ENGINE AND COOLING SYSTEM

37. ENGINE: The engine must be of the 4-cycle type, water-cooled having not less than four cylinders, and provided with mechanically-operated poppet valves. It shall have a total piston displacement of not less than 390 cu. in. and must develop a torque of not less than 2300 in.-lb. at not more than 1000 ft. of piston speed per minute. (*Balance of this paragraph unchanged.*)

48. PISTON PINS: The piston-pins shall be hollow, with a wall of proper thickness. They shall be made of steel of suitable quality for the purpose, properly hardened, and ground to a high finish and proper tolerance. The hardness of piston-pins shall be not less than 477 Brinell, as a base for comparative scleroscope readings.

51. If the triple type of ring is used, having one internal ring and two external rings, two ring grooves may be used, each provided with a triple ring.

64. CONNECTING-RODS: The connecting-rods shall be of I-beam section, drop forged from steel equal to S. A. E. steel No. 1036, and properly heat treated.

84. All oil-pipes shall be either pressed or cast integrally with the crankcase, or the oil-pipes may consist of external leads. If external leads are used, they shall be short and rigid or properly clipped to prevent vibration and chafing.

86. The crankcase must also be provided with an effective oil-level indicating device, of the bayonet-blade type, consisting of a tube extending into the crankcase to the lowest oil-level position and having the oil level indicating bayonet-blade inside of same, with marks on the blade showing the number of gallons of oil in the crankcase. The bayonet-blade shall be provided with a suitable handle and with threads for screwing into the upper end of tube. It must be installed in a readily accessible position.

91. The main and connecting-rod bearings shall be provided with laminated metallic shims, made of sheets of equal thickness. Shim sheets shall be not more than .002 in. thick.

96. SUSPENSION: Preference will be given where the engine is mounted with a three-point suspension, or on a sub-frame having a suitable three-point suspension which will effectively prevent the distortion of the frame from straining any part of the engine, clutch or transmission. If a 4-point suspension is used the engine must have short arms and be mounted on narrow sub-frame.

99. GOVERNOR: A centrifugal type engine-speed limiting governor of approved make shall be provided and adjusted so as to prevent the truck from exceeding a speed of 15 m.p.h. on high gear. The governor shall be adjustable and must have provision for sealing the adjustment and all connections of drive-shaft with suitable lead seals.*

101. CARBURETER: The carbureter must be of such design and provided with such heating devices as will enable it to use the grade of gasoline described below;

The gasoline shall, when distilled by the standard method, show the following characteristics:

(a) The temperature read when 20 per cent has distilled, shall be not less than 221 deg. Fahr.

(b) The temperature read when 60 per cent has distilled, shall be not less than 293 deg. Fahr.

(c) The temperature read when 90 per cent has distilled, shall be not less than 356 deg. Fahr.

(d) The dry point, or highest temperature registered by the thermometer at the end of the distillation, shall be not less than 428 deg. Fahr. The engine must operate with gasoline of the grade mentioned above, with satisfactory economy and regularity at all speeds and loads. The carbureter and engine intake manifold must be provided with S. A. E. standard flanges.

102. The carbureter shall be adjustable, and provided with means, readily accessible from the driver's seat and from the cranking position, for enriching the mixture when starting. The proper mixture must be obtained by operating the air control or the needle-valve. If the mixture is enriched by the operation of the needle-valve, the original carbureter adjustment must not be changed. A suitable draincock must be provided at the bottom of the float-chamber. The intake manifold must be provided with a suitable water jacket, and the carbureter must be installed in as high a position as practicable. The use of aluminum in the construction of the carburetor will not be permitted. A hot air stove attached to the exhaust pipe as manifold must be provided and connected to the main air intake of the carbureter by a flexible metallic hose suitable in size.

105. GASOLINE TANK: A suitable drum steel gasoline tank shall be provided, having a capacity of not less than thirty gallons. This tank shall be thoroughly tinned both inside and outside and must be constructed in accordance with drawing. Deep sumps must be provided to catch water and dirt, and petcocks attached for draining.

111. COOLING SYSTEM: The cooling water must be pump-circulated, and the system must be so designed that it can be completely drained by opening a single draincock. The draincock must have a free opening not less than three-eighths inch in diameter, and be located in such a position as to permit the water to run directly into a bucket placed under the draincock. Thermo-syphon system will not be acceptable. The water-pump must be of such design as to permit thermo-syphon circulation in case of pump failure. The use of the gear type of pump will not be permitted. The water pumpshaft passing through packing gland must be of bronze.

116. The radiator shall have a frontal area or cooling section of not less than 2.25 square inches per square inch of piston-swept surface, and a total radiating surface in radiator of not less than 90 square inches per square inch of swept-surface. The piston-swept surface shall be obtained by multiplying the circumference of cylinder bore by length of stroke, by the number of cylinders. Limiting the above cooling surface does not excuse failure to comply with paragraph 41.

117. RADIATOR HOSE: The distance between the ends of radiator hose connection and ends of hose connections of engine shall be not less than 1.3 of the distance from the center of third point of support to the center of the hose connections of engine. The connections for hose on both engine and radiator must be not less than 2 inches in length. The upper radiator hose must be non-collapsible. The lower connection to consist of a steel tube —— outside diameter connected with short pieces of hose at each end. A definite

*Those with slide valves to have sufficient clearance so as to prevent jamming and sticking.

diameter tube is requested so that a water heater can be attached if desired.

118. A fan of not less than 30 inches diameter with suitable fan housing shall be provided which will cause a circulation of air through all parts of the radiator, and insure proper cooling of the circulating water. The fan pulley and fan-belt driving pulley must be so arranged as to permit of ready replacement, adjustment, or removal of the belt. The fan-belt and fan pulley must be constructed in accordance with S. A. E. standards. The belt shall be 2 inches wide, and be provided with a spring take-up.

ELECTRIC LIGHTING AND IGNITION

121. The truck must be provided with a suitable electric lighting system. The lighting system shall consist of a generator driven from the power plant, a reverse current voltage cut-out 4-cell Edison battery, electric lights, fuses, wiring, and other necessary details. The ignition system shall consist of a high-tension magneto with impulse attachment for starting. The high tension magneto shall be so designed and constructed as to give the minimum spark lag at all engine speeds. The magneto must be readily controllable from the driver's seat. The range of spark-advance shall be not less than 30 degrees of crank angularity.

123. GENERATOR: The generator shall be of the fully enclosed, direct-current, constant-voltage, type, with a flat or drooping voltage characteristic, and must have a continuous capacity of 15 amperes. The voltage of the generator when installed on the truck shall be not more than 8 volts at one ampere, and not less than 7 volts at 15 amperes. The voltage regulation must be the same with varying engine speeds, up to governed engine speed. The generator must be driven from the engine by means of suitable gears. The gears drive must be completely enclosed, thoroughly lubricated, and effectively protected from dust and dirt.

(Paragraph 138 of quartermaster's specifications omitted.)

Under Searchlight, paragraph 141 diameter is given as 10 in. outside front flange instead of 10½ in. as in the quartermaster's specifications.

Under Sidelamps, paragraph 144, 8 c.p. tungsten bulbs are specified instead of 15 c.p. as in the quartermaster's specifications.

148. AMMETER: Furnish and install in a suitable location a flush type ammeter of best make, having a 25-ampere double scale for indicating the charge and discharge of battery, and provided with a black dial bearing white figures. It shall be installed in such a location as will permit it to be readily observed from the driver's seat, and properly illuminated by the instrument light.

157. The fuse box shall be of substantial make, well lined with insulating material, and the wires must run in from below. 100 per cent overload wire fuses shall be used.

160. The magneto ignition switch must be separate from the lighting switch, and of very substantial design, well grounded. The lighting switch should be of substantial make and black enameled.

164. BATTERY: Furnish and install on the truck a 4-cell, Type B4H (A. N. S.) Edison battery having a capacity of not less than 75 ampere-hours, at a 16-ampere discharge rate. The battery box must be sufficiently large to hold a 3-cell load battery if used for replacement.

171. FRAME: The frame shall be constructed of pressed steel or standard rolled structural sections. The frame and suspension must be so designed as to prevent cramping of any part, due to distortion of frame because of uneven road conditions. The distance from back of driver's seat or engine compartment to rear end of frame shall be approximately 128 in.

172. The frame shall be reinforced at proper intervals with suitable cross members thoroughly fastened to the frame with hot rivets or fitted bolts riveted over nuts. All holes in the frame shall be drilled, not punched. Rear end of frame to be equipped with Ordnance Department Standard Pintle Design, 29¼ in. from ground when truck is one-half loaded.

173. For supporting the body five cross bars of ship channel section six inches high shall be permanently attached to frame as per Ordnance drawing—Sketch July 9, 1917.

190. BODIES: Bodies are not to be furnished unless specifically called for. The construction of chassis shall be such as to permit the proper installation of body having the following inside dimensions: Width, 43 in.; 47 in. over all projections; length, 112 in. inside, 114 in. overall; height, 36 in. inside, with the floor of body not over 45 in. above the ground when the truck is loaded.

194. Flanges must be fitted on the clutch pedal to prevent the driver's foot from slipping off. The pressure on the clutch pedal pad necessary to disengage the clutch must be not more than 60 pounds, nor less than 40 pounds. An adjustable auxiliary spring may be used to secure the pedal pressure specified. The maximum throw of clutch shall be seven inches.

203. The gears of transmission must be cut on suitable gear shapers or gear generating machine, from forged steel blanks of alloy steel equal to S. A. E. specification No. 2320, 3120, properly case-hardened, or from alloy steel equal to S. A. E. specification No. 2345, 3250, 3350, or 6150, properly heat-treated and accurately assembled to a quiet-running fit under load. These gears must have sufficient width of face and strength to transmit the full power of the engine at all gear ratios, with a proper factor of safety.

220. All steel differential or driving gears shall be machine cut on suitable gear generators, from forged blanks of S. A. E. steel No. 2320, 2330, 3120, or equal, and properly heat-treated.

245. Springs must be made of alloy steel, heat treated to develop the following physical properties:

Minimum elastic limit, 170,000 lbs. per square inch.
Tensile strength not less than 210,000 lbs. per square inch.
Elongation, not less than 5 per cent in 8 inches.
Brinell hardness, 367-470.

Care must be exercised to prevent specimen from slipping in the grips and causing diagonal strains.

246. DEFLECTION OF SPRINGS: The deflection of rear springs shall be not more than 1400 pounds per inch, and not less than 1000 lbs. per inch; the deflection of front springs not more than 1000 pounds and not less than 800 lbs. per inch.

253. SPRING CLIPS: Spring clips must be made of alloy steel equal to S. A. E. specification No. 2330, 3130, or 3520, properly heat treated, to develop physical properties at least equal to the following:

Elastic limit, 100,000 lbs. per square inch.
Tensile strength, 130,000 lbs. per square inch.
Elongation, 16½ per cent in 2 inches.
Reduction of area, 55 per cent.
Brinell hardness, 250.

## Specifications for 2-Ton Gasoline Motor Trucks with Four-Wheel Drive

1. LOAD CAPACITY: Two-ton trucks must be of sufficient strength, and provided with sufficient power, to carry and propel the following gross load under the most severe service conditions.

| | |
|---|---|
| Pay load | 4000 lbs. |
| Body | 1075 lbs. |
| Three men | 525 lbs. |
| Extra equipment | 200 lbs. |
| Total | 5800 lbs. |

The extremely severe conditions under which these trucks will be operated indicate that they should be designed for a nominal pay load of 5000 pounds.

2. WEIGHT OF CHASSIS: The maximum weight of chassis, without body or extra tools and parts equipment, and without gasoline, water or oil, must be not more than 6500 lbs. A definite statement must be made showing exactly what equipment is included in the stated weight.

3. WHEELBASE: The wheelbase must be suitable for the use of a 114-inch body, and shall be not less than 116 inches or more than 140 inches.

4. GAGE: The gage of wheels on two-ton trucks measured from center to center of felloe bands shall be 60½ in. with 6 in. single tire. A 56-in. tread may be used.

# French Manufacturers' Plans Uncertain

## Sixfold Expansion of Factory Capacity Indicates Overproduction If All Concentrate on Motor Vehicle Work After War—Fewer Models and Quantity Output of Low-Priced Cars Probable

By W. F. Bradley
*Special Representative in Europe of*
THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES

VERY few after-the-war programs are being announced by French or other European manufacturers. There is a tendency to adopt a mysterious attitude and to frown on any attempt to get information on the type of cars or the capacity of the factories when they return to peace conditions. Fiat is a noteworthy exception, for the leading Italian firm has revealed one of its post-war models, now being produced in quantities for the army, has announced the general characteristics of the others, and makes no secret about the size of its factory and its after-the-war capacity. This frankness comes as a shock to some of the others, who have begun to believe that their plans are as sacred as secrets of national defense.

### Conditions Are Different

The fact is that many important factories do not yet know what they are going to do after the war. Conditions have so changed that it is obvious they cannot continue on the same lines as in 1914. But as to the type of car they are going to build, where they are going to put the electric starter—for they are now all convinced that a starter will have to be built in with the car—what lighting set they will employ, what type of wheels and what make of carbureter will be employed, some, perhaps many, firms have no conception. If the war were to end this year, which nobody seriously considers to be possible, there would be a scramble in the automobile industry to get out new designs and to lay plans for peace production. Obviously, however, the war will come to an end some day, and the war department has taken this into consideration, for many contracts formerly given for long periods are conditional on the duration of the war. These contracts cease on the cessation of hostilities, the firms involved being obliged to take stock and present bills for the goods delivered up to that time, without any compensation for material in hand. A sudden and unexpected peace would find some firms in a peculiar position.

### Two De Dion Fours and Two Eights

De Dion Bouton has announced his post-war models. These will be a couple of medium-size fours and two eight-cylinder cars. Darracq will produce one model. Hispano-Suiza will come out with an eight-cylinder high-grade touring car. This is not surprising when it is considered that the firm is the biggest producer of eight-cylinder aviation motors in the world.

All kinds of rumors are afloat regarding cheap cars after the war. One of the most persistent is that Berliet and Citroen are to enter into partnership with Henry Ford to produce a French Ford. This report is repeated everywhere, with many variations. In one case, the Ford car, as it exists at present, will be produced in the Berliet factory and marketed as the Berliet-Ford, in order to remove the prejudice which still exists against cheap American cars. In another quarter, Renault is dragged into the group, and will form a corporation with Berliet and Citroen, either to build the Ford car or to knock the bottom out of Ford. The best reply to all these rumors is that the Ford people only know of them by hearsay, and are interested only in getting their Bordeaux and Southampton factories into condition.

### Berliet Plans Big Production

It is certain, however, that Berliet is laying plans for the production of cheap cars on a big scale. The factory, although not one of the biggest, is the most modern in France, and the management has always been progressive. It is stated on very good authority that the after-the-war plan is settled in all its details, but it is not yet known whether Berliet will attempt to get down to the low figure of the Ford, or will work on the lines of a small car selling at a medium price, according to American standards.

The task before European manufacturers is not at all easy. They have to consider European conditions, which are special and exacting, and those of colonial countries. The two types are so different that the suggestion has been put forth of a single French model, to be known as the French car, for the export market. It is safe to predict that lack of unity among manufacturers will prevent such a scheme being carried to execution. A similar suggestion has been made in England, where it is pointed out that as American cars sell well in England and her colonies the home manufacturers should build primarily for colonial conditions, with the assurance that the home market would be satisfied with the same type, just as it is now satisfied with the American machine. This is doubtful, however, for while the cheaper American cars sell well in England, the higher class clientele will not look at anything but the European article. It is certain that after the war the horsepower tax will not be lessened, and that it will be some time before cheap fuel—gasoline, benzol, or alcohol—will be put on the market. Thus cylinder dimensions and gasoline consumption will have to be given careful consideration. At present, a Ford costs more to maintain than many cars costing six times as much, three times as powerful, and twice as fast.

### Capacity Increased Sixfold

On a moderate estimate, the productive capacity of the French automobile factories is now six times greater than it was before the war. In 1916 alone, France imported 687,000,000 francs' worth of machine tools. Of course, these did not all go to the automobile factories, and it is impossible to get any very definite figure on the increased values of the automobile plants. But the sixfold increase is arrived at from a number of known cases and observation of others. The greatest increases have not always been in the well-known firms, but in

some of the smaller shops, which started out in 1914 with next to nothing and have grown to a possible capacity of 5000 cars a year. In addition, there are hundreds of small machine shops, employing from 300 to 500 men, erected for shell work only, which are likely to be turned to automobile work when war orders cease. These shops will be a disturbing element, for their plants have been designed for shell work only, and are not suited for automobile work or general engineering. Further, they are, in very many cases, in the hands of men without any business past and with no connection with the automobile industry. Attracted by a few conspicuous successes, they are likely to get on the market, cut prices for a time, and eventually fail.

Before the war, France was capable of absorbing 40,000 automobiles a year; the rest were exported, to the value of about $45,000,000. After the war it is not to be expected that France can absorb more than 100,000 automobiles in any one year. At the present time two factories are capable of meeting the entire home demand; thus, if the industry is to exist it is absolutely essential that it should regain more foreign trade than it had before the war.

**Overstocked Market Possible**

All the conditions point to an overstocked market if all the war-developed automobile factories return to their original business. One of the leading French dealers, who has handled big business at home and abroad, predicts a tremendous slump soon after the end of the war. He maintains that the commercial treaties between France and the United States make it impossible to increase the import duties, which, in the case of a car of the Ford class, do not represent more than 6 to 8 per cent of the value. On a competitive basis, and with an assembly plant in France, Ford can sell at $500, and several other American makers can put cars on the French market at $600 to $800. Between this and the cheapest full-sized French car, which, according to present indications, is not likely to be marketed at less than $1,000, there is so much difference that the result is not at all in doubt. Before the war no complete four-passenger, full-sized French car had got near the $1,000 mark. There will always be a certain demand for the super-luxe car, which can only be met by the home factories, but the volume of business under this heading cannot be great.

The future of the big factories interests the working classes, and has caused the Socialist party to call for special legislation to insure the working of these big establishments for the benefit of the entire nation after the war. It is pointed out that this abnormal growth is due to the war only, and not to any special ability on the part of the stockholders or managers of the establishments. In very many cases the Government has advanced capital necessary for extensions. There is not a single factory owner who has not received state benefit by being relieved from military service, by being supplied with military labor, by being furnished with raw material or coal, electricity or gas.

**Stock Values Very High**

In a recent parliamentary debate on this subject the position of various firms according to their present standing on the stock exchange was quoted as proof of their increased wealth, for speculation has now practically ceased. The Hotchkiss shares (the factory produces automobiles and guns), nominally of 100 francs, were quoted at 155 francs in 1914, and are now worth 1005. Founders' shares, quoted at 165 francs before the war, are now at 1800 francs. The Bimetal Company's shares were quoted at 225 francs in 1914, they are now at 1000 francs. Founders' shares not quoted before the war are now at 1700 francs. Constant-Suiza shares have risen from 90 to 360 francs in 2 years. The shares of the Cothias Aluminum Foundry were worth 84 francs in 1914, they are now worth 295 francs. The Gnome Aviation Motor Co. has repaid its entire capital, and its 500-franc shares now stand at 3600 francs. Chatillon-Commentry Forges, which specialize in automobile material, have risen from a nominal 500 francs to 2520; Schneider has jumped from the same figure to 2339 francs.

The prodigious aviation development of the last 3 years adds to the difficulty of the after-the-war automobile problem, for it can be estimated that the automobile factories are responsible for the production of about 70 per cent of the total number of airplanes and airplane motors. Georges Prade, who is an authority on this matter, stated in a recent lecture that the French aviation budget is $240,000,000, and that orders for foreign governments—England, Belgium, Russia—are now held by French firms to the value of $160,000,000. In 1914 the French army had exactly 126 airplanes, many of which had been condemned to be broken up before the end of the year. Since then production has increased in the ratio of 1 to 50.

Unless a commercial use is developed for airplanes, this $160,000,000 export business will cease with the war, and the automobile firms now building airplanes or airplane motors will return to the automobile industry. It is intended to retain as much of the airplane business as possible, and steps are being taken to develop an aerial mail service. Beyond this little can be done; aerial touring does not promise to develop quickly, and the only immediate field—which, however, is not a big one—appears to be rapid transport where cost is a secondary consideration. This means that the factories now engaged on aviation work will have to abandon this branch to a very large extent with the return of peace.

**Fewer Models After War**

There are no indications that the French industry, as a whole, will adopt the system of one factory, one model. It is indicative of a tremendous change, however, when a firm like De Dion Bouton will announce that it has decided to cut down its types to a couple of four-cylinder models, with two eight-cylinder types as de luxe models. Four distinct types from one factory may appear unnecessary complication from the American standpoint, but it must be remembered that De Dion Bouton was an extreme case, the factory producing everything from single to eight cylinders, with every type subdivided into long and short wheelbase, high and low clearance, and, in addition, interested itself in bicycles, trucks, special army vehicles, airplane motors, etc.

Indications are that the big factories, such as Panhard, Renault, De Dietrich, etc., will get down to two models, a popular type and a high-grade car. Undoubtedly it would be for the ultimate benefit of the industry for each firm to specialize on one particular type of car, but in view of past history this is difficult without a complete understanding among the respective firms, and there is nothing to indicate that the respective manufacturers are disposed to get together and discuss this problem in detail. Right now it is possible to predict a dozen firms which will build only one type of car after the war, of course with different body combinations. But these are mostly firms which already had a tendency toward a single type, and have only had to reduce from two to three at most.

Reputations in Europe are more lasting than in America, and cars sell much more on name than is the case in the United States. The public shows a preference

for the half dozen or so old-established makers, and these manufacturers take advantage of this reputation to sell cars to all classes, producing a model for every class of buyer. Undoubtedly, the war has had a leveling influence, and in the future cars will be sold less on old-age reputations than was formerly the case.

The fact that every factory in France has had opportunities during the past 3 years of handling American cars and trucks will have a certain influence on the new models. It is absolutely certain that the vast majority of cars will be produced with electric lighting and starting as integral parts of the equipment. Before the war it was very rarely that these were sold other than as an accessory. There is no reason to believe that the four-cylinder motor will be replaced by a larger number of cylinders. All the indications are that eights and twelves will be treated as special high-grade models, and not at all as competitors of the four.

# French Automobile Restrictions Still in Force

### Few Parts on Hand—Demand for Used Cars

PARIS, July 2—Judging only from the condition of the streets of Paris there has been very little change in the motor situation of France. Private car owners, however, are not allowed to motor entirely as in peace times. No gasoline can be purchased except on presentation of an official card which limits the user to 18 gal. per month per car. These gasoline cards are given out to all owners on proof of identity and presentation of the receipt for the payment of the annual car taxes. No attempt is made to ascertain what use is going to be made of the car, or to restrict the use when it is considered that it is not of general utility.

Preferential gasoline cards are issued to all persons working for the army and also for the use of automobiles in the general interest of the public. It sometimes happens that dealers refuse to supply owners of ordinary cards, reserving all their stock for the persons presenting preferential cards. The situation varies in different parts of the country, for while in some districts gasoline can be obtained readily, in other parts dealers appear to have received special instructions and will not recognize the ordinary gasoline card, although they have big stocks in hand. Around Paris the price of gasoline varies from 80 cents to $1 per gallon; in certain districts speculators have boosted the price to $3 per gallon.

**Touring Pass Needed**

It is forbidden to travel by automobile without a touring pass. The local police issue these to all applicants, for touring within a radius of about 100 miles and renew them monthly without any difficulty. Long-distance touring passes are in the hands of another authority, and although not often refused to applicants, there is a considerable amount of formality in obtaining them, and this in itself is sufficient to limit motoring. In reality the passes are practically useless, for roads are not guarded by either police or military, and it is possible to tour for weeks together without any call being made for the pass. This applies, of course, to the interior of France, and not to the war zone. From 40 to 100 miles behind the firing line is a reserved zone which cannot be entered by automobile without a special pass issued by the military authorities. Such passes are only given in exceptional cases and after a very close inquiry which may occupy a month. Any person entering the war zone, intentionally or unintentionally, without a permit is liable to court martial and the confiscation of his car. In this area roads are so closely guarded that it is frequently impossible to travel a mile without being held up by guards.

About 90 per cent of the automobile stores of Paris are closed. Having nothing to sell, dealers had no alternative. A certain number have maintained their showrooms and handed them over temporarily to the Red Cross and other charitable organizations; others, evidently foreseeing a long war, have relinquished their leases and the buildings are standing empty. During the last few months there has been a revival of commercial activity and enterprising firms have secured premises in the Champs-Elysees and other parts of the automobile district, with the intention of opening them as soon as the war comes to an end. Important changes in location are certain, for firms holding some of the best positions in the Champs-Elysees district have sold out, and others never having had positions there have secured options.

Despite the war accessory dealers are busy, their greatest difficulty being to secure sufficient goods to meet the demand. Everywhere stocks are low, for practically nothing is being produced in France and imports are only being received from America. All goods in brass and copper have been requisitioned by the military to such an extent that it is exceedingly difficult for the ordinary person to get supplies. The increase in price on all automobile accessories varies from 30 to 75 per cent. Automobile spare parts are very difficult to obtain, for the factories prefer to produce airplane engines, shells, or complete cars, rather than parts. The army automobile department makes most of its own spares, and there is no provision for the private owner.

Used car dealers are actively buying up every car offered for sale and reselling them at fancy prices. As a general rule a 1914 car with 3 years' service costs more at the present date than when it came out of the factory. All kinds of junk has been pressed into service; hundreds of 10-year-old touring cars which before the war would have been considered fit for the junk pile have been fitted with a light truck body and sold at a substantial price. Nothing is too old for the road, and nothing is turned down by the dealer. All the old cars put into service are civilian machines, for the army has not yet released its hold of a single truck. There are in the military depots thousands of dollars' worth of automobiles and automobile parts which would be of great value to the civilian population, but they cannot be obtained. The importation of automobiles is not forbidden, but with a 70 per cent duty on all but heavy trucks, no touring cars or light trucks are being brought into the country.

# Electric Spark Characteristics

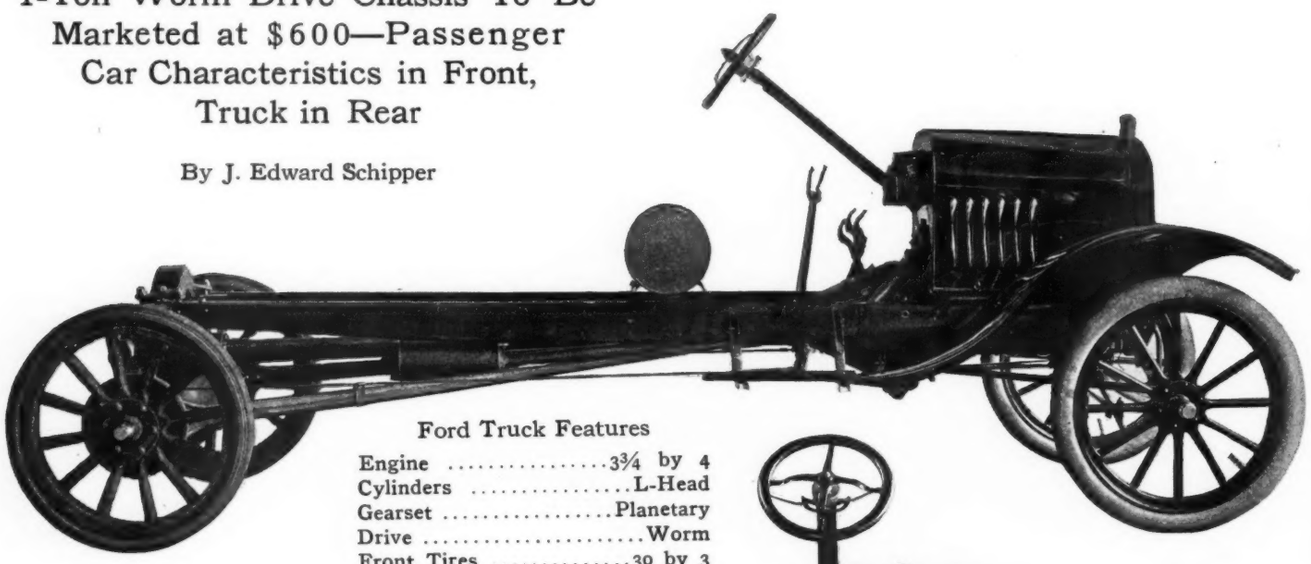
IN a recent lecture on The Electrical Properties of Gases, read before the Royal Institution by Sir J. J. Thompson, some of the laws of electrical discharges in gases were discussed. The lecturer said it was natural to assume that the potential difference required to produce a discharge would be greater the greater the distance between the terminals and the greater the pressure of the intervening gas. Within limits both these conclusions are correct, but experiment shows that there are some highly interesting exceptions. It is, in fact, extraordinarily difficult to get very short sparks. With a constant gas pressure there is a certain length between terminals with which the discharge passes more easily than with any other length of gap, whether longer or shorter. Similarly, with a constant distance between terminals there is some particular gas pressure at which the discharge passes most easily. If the pressure is either raised or lowered from this optimum value the discharge gets through with greater difficulty.

The potential required to produce a spark between two terminals depends on the quantity of gas that intervenes. If this is constant it matters not whether the pressure is low and the distance great or the pressure high and the distance short, the potential needed is constant so long as the quantity of intervening gas is constant. Hence, a very short spark may correspond to a very small quantity of gas, and a discharge will be facilitated either by raising the pressure or increasing the distance between the terminals.

# Ford Truck Ready for Production

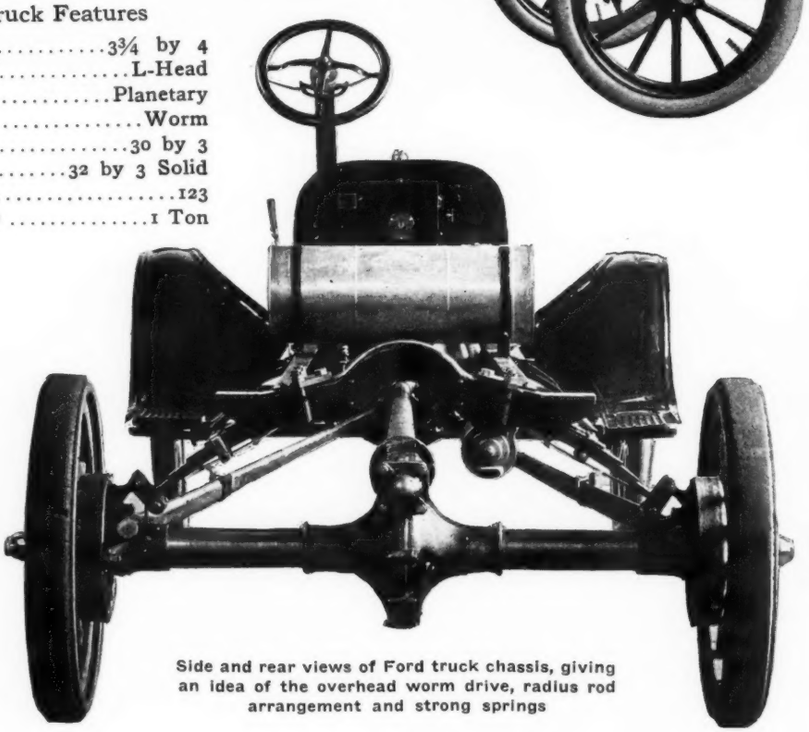
## 1-Ton Worm Drive Chassis To Be Marketed at $600—Passenger Car Characteristics in Front, Truck in Rear

By J. Edward Schipper



**Ford Truck Features**

| | |
|---|---|
| Engine | 3¾ by 4 |
| Cylinders | L-Head |
| Gearset | Planetary |
| Drive | Worm |
| Front Tires | 30 by 3 |
| Rear | 32 by 3 Solid |
| Wheelbase | 123 |
| Load Capacity | 1 Ton |



Side and rear views of Ford truck chassis, giving an idea of the overhead worm drive, radius rod arrangement and strong springs

SHIPMENTS of the Ford truck have commenced to the various branches of the Ford Motor Co. in different parts of the country, and everything is practically ready for the Ford Motor Co. to enter into active production. All details regarding the new truck have been settled, the chassis price having been fixed at $600. Most of the details of the Ford truck were made known to the trade through exclusive stories in the CLASS JOURNAL Co. publications in April. The production on these trucks is now being brought up to twenty-five a day and will before long be up to fifty.

**To Limit Allotments**

Such a demand has been made on the Ford Motor Co. for the truck that the dealers will be limited in the number of chassis turned over to them, and it will probably be a great many months before the Ford Motor Co., even at the output of fifty a day, can absorb the demand made throughout the country for these light trucks.

The Ford truck, as a study of the illustrations will show, is a neat combination of the Ford chassis, which has proven so successful in passenger car usage, and a worm-drive truck chassis capable of taking the rated load of 1 ton. As far back as the front universal joint, the Ford truck is exactly like the Ford passenger car. It has the same engine and the same planetary gearset as those used in the model T cars. Beyond this point, however, the chassis is longer with heavier side members, and the rear axle has been changed to take the overhead worm drive. It is 23 in. longer than the passenger car, having a wheelbase of 123 in.

The Ford Motor Co. will sell this truck in chassis form, because the variety of usages to which it may be put is so great that it would be a matter of great difficulty to turn out a production body that would suit a very large percentage of the users of the truck. By supplying this in chassis form the user can adapt it to his wants at the minimum cost by fitting whatever type of body he desires. Ever since the early announcements made by THE AUTOMOBILE and AUTOMOTIVE INDUSTRIES that the Ford Motor Co. would produce a truck, the company has been deluged with inquiries from all over the country showing an enormous demand which exists for a low-priced commercial vehicle, which can be utilized by the small merchant in carrying out his delivery problems.

While the price has not as yet been settled by the Ford Motor Co., it is known that it will be exceptionally low on account of the big production and easy marketing facilities extended by the Ford organization. The simplicity of the control system, to which drivers have been educated by the extended use of the Ford T car, renders this a vehicle which can readily be placed in the hands of an average automobile driver.

The distinctive feature of the Ford truck, aside from its use of the model T engine, and the planetary gearset, is the overhead worm drive, use of solid tires in the rear and pneu-

matic tires in front, and its electric headlight equipment operated from the Ford magneto in the same way as they are now being furnished on the Ford passenger cars.

Using the same power plant as they do on the passenger car, no special provision for production has had to be made for the engine in the Ford factory. It is a four-cylinder block unit, with 3¾ by 4 in. L-head cylinders with valves on the right.

The crankshaft operates on three bearings and the camshaft is driven by spur-gears. The intakes and exhaust are cast separately. Cooling is by thermo-syphon with a fan behind the radiator, which is a tubular type. Ignition is by single low tension magneto incorporated in the flywheel, and this same magneto operates two electric headlights. The tail and sidelights are oil. The carbureter is a Holley instrument having a hot-air fitting which clamps over the exhaust manifold, giving a complete supply of heated air for cold weather evaporation. There is a dash carbureter adjustment controlling the needle valve. Lubrication is by gravity with the oil carried to the front end of the motor and the timing gears by means of the flywheel, through the oil tube, after which it returns by gravity to the flywheel casing in the crankshaft.

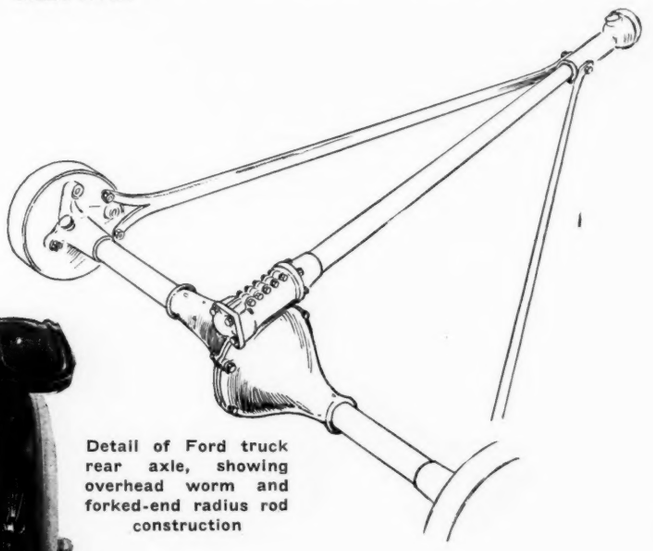
The clutch is a multiple disk in oil, delivering the drive to a two-speed planetary gearset in unit with the engine. From here the final drive is by means of a propeller shaft and top worm. The ratio in the worm gear is 7.25 to 1, giving a total gear ratio in low of 19.9 to 1, and a total radius in reverse of 29 to 1. From the worm the drive transmission passes through the bevel gear differential and semi-floating rear axle to the rear wheels.

The propulsion stresses are taken through radius rods which are fastened by means of pivot connections at the outer ends of the rear axle and through the tube which surrounds the propeller shaft. The driving torque is taken through the torsion tube which surrounds the propeller shaft. The springs are the same as those used in the Ford passenger car excepting that they are made heavier in the rear to withstand a great load. This is a transverse type having an arch in the center.

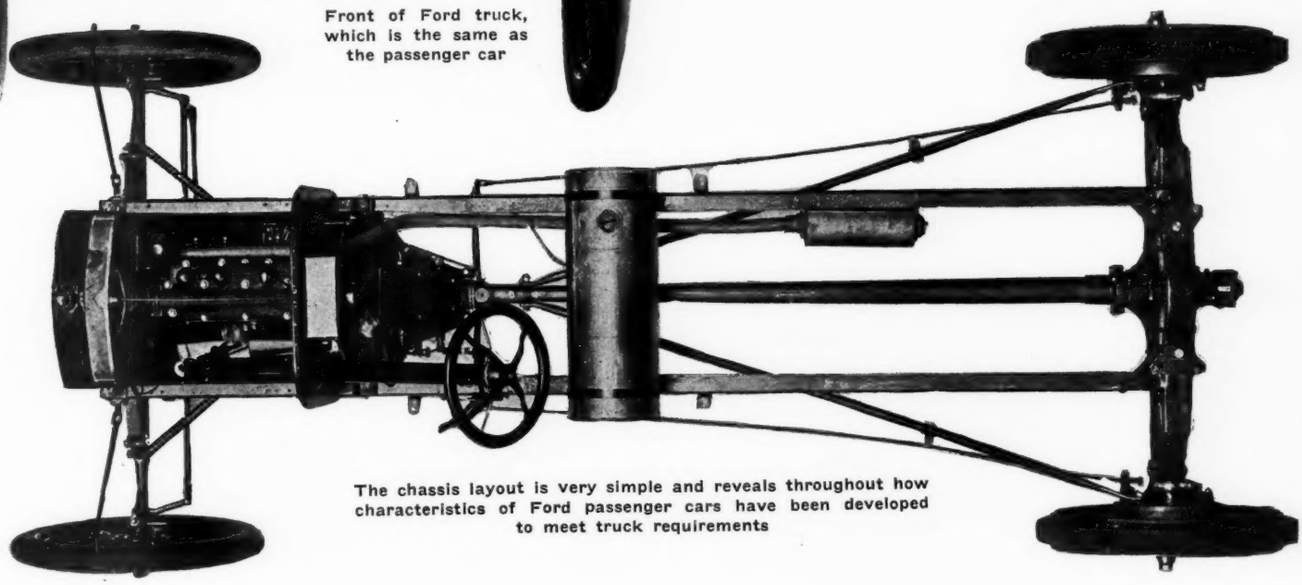
The tire equipment is solid in the rear and pneumatic in the front, in both cases the tires being of the single type. Those used in the rear are 32 by 3 in. and those in the front are 30 by 3 in. The wheels are wood artillery type with oval spokes and the brakes are the same as in the Ford T passenger car with the service brakes on the transmission, and the hand brake on the rear wheels. The transmission drive-shaft brake is an external contracting type and the hand brake is an internal expanding of the rear wheels.

The steering gear is mounted on the left and control system is the standard Ford layout with three pedals and the brake lever.

Front of Ford truck, which is the same as the passenger car



Detail of Ford truck rear axle, showing overhead worm and forked-end radius rod construction



The chassis layout is very simple and reveals throughout how characteristics of Ford passenger cars have been developed to meet truck requirements

# Rules for 1917 Tractor Demonstrations

## Carefully Considered Regulations Place All Competitors on the Same Basis—All Demonstrations To Be Public—List of Exhibitors

RULES have been completed governing the demonstrations of tractor plowing which will be held at Fremont, Neb., during the week of Aug. 6. These demonstrations will be held under the auspices of the National Association of Tractor and Thresher Manufacturers, and will be the only official tractor demonstrations of the year. Following are the rules:

### Rules for 1917 Tractor Demonstrations

1. Public demonstrations will be made forenoon and afternoon each day and no so-called private demonstrations will be made.

2. No exhibitor will be allowed more than one tractor of *each size on the field during the public demonstrations doing the same kind of work.* He may have *one* or *more* machines performing different operations, namely—one plowing, one disking, one seeding, etc.

3. Size of land for each tractor exhibitor for plowing demonstrations will be determined by the average number of plow bottoms pulled, the width of plows and speed of machines as given in Company's catalog. Each tractor exhibitor must plow out dead furrow to its left.

4. All exhibitors will be allotted land in the same field or adjoining fields during each day's demonstration period.

5. All plows on any given gang must be set at the same depth and kept there during the demonstration period. This depth will be announced daily by the general manager. (Plows found operating otherwise, will be ordered from the field for the balance of day's work.)

6. In all *public demonstrations, the motor of tractor must be run at more than* 10 *per cent above its catalog speed.*

7. Positions on field first day will be arranged alphabetically. Each field will be divided into four divisions, A, B, C and D. These positions will shift daily, making each exhibitor occupy a similar position on the field as does his competitor. Each exhibitor will be required to finish his land daily in a workmanlike manner, and assist in plowing the end lands as directed by the general manager.

8. Each field will be surveyed and staked ready for each day's demonstration. *These fields will be tested for the drawbar pull of a* 14*-in. plow, plowing at a specified depth, previous to the demonstration. All manufacturers will be furnished information relative to drawbar pull so they can better determine the number of plows to use on each gang.*

9. Each tractor shall bear a placard, to be furnished by the chief observer, showing the brake horsepower of the engine, the revolutions per minute, the plowing speed in miles per hour, and the kind of fuel used and its Baumé test. Tractors using more than 5 per cent of gasoline shall be classed as burning gasoline and be so placarded.

10. All tractors on the demonstration field belonging to one exhibitor must be kept on or along land allotted him for that day's demonstration, until the hour designated by management for returning to headquarters.

11. No machine will be allowed to operate with special equipment other than designed for practical use with same. No spectacular methods will be permitted on the part of salesmen or others, to attract crowds. The demonstration must speak for itself.

12. Each tractor exhibitor will have the privilege of burning any kind of fuel he desires, but no one will be permitted to burn fuel of higher gravity test than that used by his competitor burning the same kind of fuel. All exhibitors will be required to obtain fuel from source designated by general manager.

13. Public demonstrations will start on Monday at 7 o'clock A. M., and will continue each forenoon and afternoon until Friday, P. M.

14. No time will be required of exhibitors to make movie picture or group photographs for commercial purposes. Manufacturers can arrange to get photographs during demonstration if they desire. Any manufacturer or representative of farm, trade papers or news agencies will be allowed to have their photographer on the grounds to get pictures.

15. Manufacturers will be privileged to make *fuel tests or meter tests of drawbar pull of their tractors during any day of demonstration, but these will not be official and cannot be published as authorized by the management of the demonstration.* (Such tests will be purely educational.) They may also make fuel consumption tests if they so desire. These tests must be made in forenoons, or following public demonstrations, afternoons.

16. Arrangements will be made *for daily demonstrations showing use of tractors harrowing, disking, seeding,* and other farm *operations, demonstrating general utility of the tractor.* The Rules governing these demonstrations will be same as those applied to plowing.

17. The interpretation and enforcing of these Rules shall be left to the Field Manager of the demonstration under the direction of the Committee.

18. Each Company exhibiting at this demonstration shall appoint one manager who will be expected to report to the general manager not later than seven o'clock each morning for instructions and information regarding the day's work. This manager of exhibits will be held accountable for the work of his Company, and no instructions will be issued to anyone else, nor will requests, instructions or complaints be recognized from anyone but this exhibit manager. He shall wear a badge furnished him, specifying his being official exhibit manager.

19. Each exhibitor will be expected to keep plows, tractors, etc., around his tent arranged in first-class order, and the land allotted him for exhibiting purposes, free from circulars, rubbish, etc., such as will be distributed around headquarters daily. They will also be expected to use care at all times in operating machinery in respect to its safety for all visitors. The Management will appreciate co-operation of these exhibit managers in all matters.

20. Each entrant will sign the Rules and hereby agrees to live up to the Rules and co-operate with the committee in every way to make the tractor demonstration a success.

21. The field manager shall have authority to order from the field any machine whose operator does

not comply with the Rules, and, further, any exhibitor who is manifestly disregarding the Rules will not have land laid out or furnished for him on the succeeding days, or until such time as he has met the conditions.

22. Each exhibitor desiring to enter in this demonstration agrees not to patronize or exhibit directly or indirectly any tractors in any tractor demonstrations not sanctioned by the Association, and in case they do so, they may be considered as ruled out of the National Demonstration.

23. Each manufacturer reserves the right to put on and promote dealers' tractor demonstrations and help the local dealer in any way they see fit, but they will not enter any dealers' tractor demonstration directly—it must be done by a regular dealer under contract.

24. Any manufacturer has the right to put on private demonstrations at any time or place he may see fit, but such private demonstrations are to be strictly private, and no other make of machine except their own to be exhibited.

25. No exhibitor joining the National Demonstration will be permitted to exhibit until he has given corectly the price that he is in *position to furnish tractors* at, the *correct weight of tractors,* and *all data pertaining to their construction and rating, minimum and maximum speed* at which the motors are to run, and the committee have the right to have any such machines placed under test to prove the correctness of the data that is furnished.

26. The National Tractor Demonstration is being put on by the members of the National Association of Tractor & Thresher Manufacturers as an Auxiliary to the National Implement & Vehicle Association for the benefit of the members of these Associations. No manufacturers are eligible to exhibit unless they are members of the National Implement & Vehicle Association or the Tractor & Thresher Manufacturers Association.

27. In addition to the Field Manager, there will be an Inspection Manager with a corps of inspectors whose duty it shall be to see that the machines are operated in accordance with the Rules and Regulations.

28. It shall be against the Rules and Regulations for any tractor manufacturer to put on an exhibit on the street corners of the city where the tractor demonstration is held, or do any other thing in the way of exhibiting machines that would detract from the tractor demonstration and the regular established exhibits in the tents.

29. *Exhibitions of machinery to be driven by belt power will not be permitted.*

30. The management shall select one forenoon during the demonstration which shall be designated as *"Plow Day,"* when *all plows of each manufacturer shall be brought together, plowing upon the same or adjoining lands.*

### List of Plow and Tractor Manufacturers who will Exhibit at the 1917 Tractor Demonstration

Advance Rumely Co., Inc., LaPorte, Ind.; The Aultman & Taylor Machinery Co., Mansfield, Ohio; Avery Co., Peoria, Ill.; Bull Tractor Co., Minneapolis, Minn.; Bullock Tractor Co., Chicago, Ill.; J. I. Case Plow Works, Racine, Wis.; J. I. Case Threshing Machine Co., Racine, Wis.; The Cleveland Tractor Co., Cleveland, Ohio; The Common Sense Gas Tractor Co., Minneapolis, Minn.; The Dauch Mfg. Co., Sandusky, Ohio; Deere & Co., Moline, Ill.; The Dunham Co., Berea, Ohio; Electric Wheel Co., Quincy, Ill.; Elgin Tractor Corporation, Elgin, Ill.; Emerson-Brantingham Implement Co., Rockford, Ill.; Grain Belt Tractor Co., Minneapolis, Minn.; Grand Detour Plow Co., Dixon, Ill.; The Hansmann Mfg. Co., Long Prairie, Minn.; The Holf Mfg. Co., Peoria, Ill.; International Harvester Co. of America, Chicago, Ill.; Interstate Engine & Tractor Co., Waterloo, Iowa; The Joliet Oil Tractor Co., Joliet, Ill.; Kardell Tractor & Truck Co., St. Louis, Mo.; LaCrosse Plow Co., LaCrosse, Wis.; LaCrosse Tractor Co., LaCrosse, Wis.; The John Lauson Mfg. Co., New Holstein, Wis.; Lyons Atlas Co., Indianapolis, Ind.; The McIntyre Mfg. Co., Columbus, Ohio; Minneapolis Steel & Machinery Co., Minneapolis, Minn.; Monarch Tractor Co., Watertown, Wis.; Moline Plow Co., Moline, Ill.; New Age Tractor Co., Minneapolis, Minn.; Nilson Tractor Co., Minneapolis, Minn.; Oliver Chilled Plow Works, Omaha, Neb.; Parlin & Orendorff Co., Canton, Ill.; Parrett Tractor Company, Chicago, Ill.; Peoria Drill & Seeder Co., Peoria, Ill.; Rock Island Plow Co., Moline, Ill.; Roderick Lean Mfg. Co., Mansfield, Ohio; The Russell & Co., Massillon, Ohio; Stinson Tractor Co., Minneapolis, Minn.; Velie Motor Corporation, Moline, Ill.; The Vulcan Plow Co., Evansville, Ind.; Waterloo Gasoline Engine Co., Waterloo, Iowa; Four Drive Tractor Co., Big Rapids, Mich.; Allis-Chalmers Mfg. Co., Milwaukee, Wis.; The Buckey Mfg. Co., Anderson, Ind.; C. O. D. Tractor Co., Minneapolis, Minn.; Dayton Dick Co., Quincy, Ill.; Farm Horse Traction Works, Hartford, S. D.

The demonstrations will be purely educational in nature, and there will be no judges, no prizes and no official report, every observer being urged to note for himself the performance of the different tractors and to draw his own conclusions. Associated with A. E. Hildebrand in the management of the demonstrations will be a number of men who are said to be absolutely disinterested in both tractors and tractor machinery and they will carry out the regulations printed above, which have been accepted by the National Power Farming Committee.

The demonstration headquarters are located just outside of the city limits of Fremont, and the 3000 acres to be plowed is all within a short distance of the headquarters. Public demonstration will begin at 7 a. m. Monday, Aug. 6, and continue each forenoon and afternoon until Friday, Aug. 10. The land to be plowed will be surveyed by the field engineer and the amount of land allotted to each exhibitor for plowing demonstrations will be determined by the number of plow bottoms pulled, width of plows, and speed of machine as given in the company's catalog. Each tractor will bear a placard showing the brake horsepower, and revolutions per minute of the motor, plowing speed in miles per hour, and the kind of fuel used. All plows will be set at a given depth, which will be determined by the general manager, and the motor speed will not be allowed to exceed its catalog speed more than 10 per cent.

Realizing that on such occasions the tractors are often judged by the character of plowing done and that the selection of a plow to use with the tractor is a problem in which all tractor prospects are interested, the manager will select one forenoon during the demonstration which shall be designated as Plow Day. At this time all plows of a given make will be grouped together and plow upon the same or adjoining land.

In addition to the plowing demonstrations there will be an exhibit of power-forming accessories for which the following firms have secured space:

S. K. F. Ball Bearing Co., Hartford, Conn.
Diamond Chain Co., Indianapolis, Ind.
Byrns Kingston Co., Kokomo, Ind.
Timken Roller Bearing Co., Canton, O.
Delco Engineering Co., Dayton, O.
Holly Bros., Detroit, Mich.
Buda Motor Co., Harvey, Ill.
McQuay Norris Co., St. Louis, Mo.
Hyatt Roller Bearing Co., Chicago.
Perfex Radiator Co., Racine, Wis.
Kokomo Elec. Co., Kokomo, Ind.
Balso Elec. Co., Detroit, Mich.
Universal Detachable Lug Co., Chicago.
R. D. Nutthall Co., Pittsburgh, Pa.
Standard Oil Co., Omaha, Neb.
Doman Motor Co., Oshkosh, Wis.
New Departure Ball Bearing Co., Bristol, Conn.
Champion Spark Plug Co., Toledo, O.
K. W. Ignition Co., Cleveland, O.
Vacuum Oil Co., New York.
Waukesha Motor Co., Waukesha, Wis.
Climax Engineering Co., Clinton, Ia.
Sumter Elec. Co., Chicago.
Modine Elec. Co., Racine, Wis.
Eiseman Magneto Co., 8 Bush Terminal, Brooklyn, N. Y.
Maltby Specialty Co., Detroit.
Keystone Lubricating Co., Chicago.
Remy Elec. Co., Anderson, Ind.
Erd Motor Co., Saginaw, Mich.
Link Belt Co., Chicago, Ill.

# The FORVM

## Air Resistance of Tilted Windshields

By E. M. Vance

THE comparisons of the wind-resistance of vertical and inclined windshields respectively, published in a recent issue, were not strictly correct, as the resistance is not directly proportional to the projected area of a surface. If the wind resistance depended only on the projected area there would be no advantage in providing racing cars with a wind-splitting prow, and it has been conclusively proven that this helps a great deal. It is, moreover, easily demonstrated that the air resistance decreases faster than the projected area when a windshield is tilted. When a plane surface moves straight against the air, the air resistance varies as the square of the speed, and it is, of course, also proportional to the area of the surface. When a surface moves obliquely against the air at an actual speed $v$, if $a$ is the angle between the direction of motion and the moving plane, the virtual velocity in a direction perpendicular to the plane is $v \sin a$, as may be seen from the diagram, and as the resistance is proportional to the square of this factor it is proportional to $v^2 \sin^2 a$. Thus for the same speed the air resistance varies as $\sin^2 a$. A moderate inclination does not appreciably reduce the projected area of the shield but it results in quite a reduction of the air resistance. This can be seen from the following table which shows the reduction in per cent of the shielded area and the reduction in wind resistance for various inclinations of the windshield to the vertical from 10 to 30 deg. inclusive:

| Angle of Plane, Deg. | Reduction of Projected Area (Per Cent) | Reduction of Air Resistance (Per Cent) |
|---|---|---|
| 10 | 1.5 | 3.0 |
| 12 | 2.2 | 4.2 |
| 14 | 3.0 | 5.8 |
| 16 | 3.9 | 7.6 |
| 18 | 4.9 | 9.5 |
| 20 | 6.0 | 11.6 |
| 22 | 7.3 | 14.0 |
| 24 | 8.6 | 16.4 |
| 26 | 10.1 | 19.2 |
| 28 | 11.7 | 22.1 |
| 30 | 13.4 | 25.0 |

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## A New Power Rating Suggestion

By John Sturgess

THE article Horsepower Facts and Fallacies by A. Ludlow Clayden appearing in this publication on April 26 is timely. The present writer's conviction, however, is that Mr. Clayden does not go far enough in pointing out the erroneous conceptions of power rating that exist in the average autoist's mind, and presents the following reason for this conviction:

Automobiling is a branch of engineering, and has necessarily adopted engineering terms and measurements. But the great majority—nearly all automobilists (in which term is included manufacturers, designers and users)—have little or no training or experience in the fundamentals of engineering. Instead of beginning the acquisition of their present knowledge by familiarizing themselves with these fundamentals, they begin half way up the ladder—at automobiling. It is no wonder therefore that much confusion has arisen from the adoption of engineering terms having very specific meanings.

Horsepower is a case in point. It means rate of doing work, or overcoming resistance. It is essentially the *rate*—how much effort per unit of time, or the pressure exerted and the distance over which pressure is exerted in a given time. A horsepower is 550 lb. exerted (pulled or pushed) a distance of 1 ft. in 1 sec. It is the last two factors (distance and time) that constitute the rate for a given exertion, and horsepower, in an engineering sense (and automobile sense too), is unthinkable without the rate being given.

Yet in automobile parlance the rate is rarely given, or even comprehended. Mr. Clayden reproduces manufacturers' charts showing horsepower developed where the rate (as he points out) could not exist. The average autoist possessing a 50 hp. car believes he has a 50 hp. engine all the time, but he has not. It is only 50 hp. if he is traveling about, say, 60 m.p.h. and the road and air resistance are just right. At 30 m.p.h. he has a 25-hp. engine; at 10 m.p.h. an 8 hp. engine. If he wants to go 10 m.p.h. on steep heavy roads he cannot get more than 8 hp. out of his engine to do it with. For horsepower is roughly proportional to speed, which is rate.

The reason that this is not understood is simple enough. It is that the automobilist is not really concerned with horsepower. Horsepower is not what he wants, though he uses the term to express what he is conscious of needing.

**Driving Effort the Essential**

What is it he does want? Simply driving effort—tractive effort—torque on driving wheels *at* various speeds. It is essential that he have various efforts at various speeds. He wants low effort at high speed for smooth roads running before the wind on slight down grades. He wants great effort at slow speeds for the reverse conditions, and all intermediate gradations. And for decent comfort this must all be accomplished on direct drive.

These great variations must be secured by the simple expedient of varying the richness of the explosive mixture, which most automobile engineers recognize to be entirely inadequate to cover the range required. A compromise is resorted to by making the engines excessively large, regardless of cost.

I must here take issue with Mr. Clayden's remark (page 821 of the issue of April 26) where he says:

"Now, with a steam engine we can have a constant power output because the product of pressure and steam can be kept constantly within limits, but a constant power is *not* what is wanted for maximum performance. What we desire is a constant *tractive effort*, unaffected by speed, and this is more easily obtained by steam than with gasoline."

I contend that we do not want a constant tractive effort. We want a widely varying effort to meet resistance conditions (road, incline and wind) and we want independent control of tractive and speed conditions. They must not be related, or

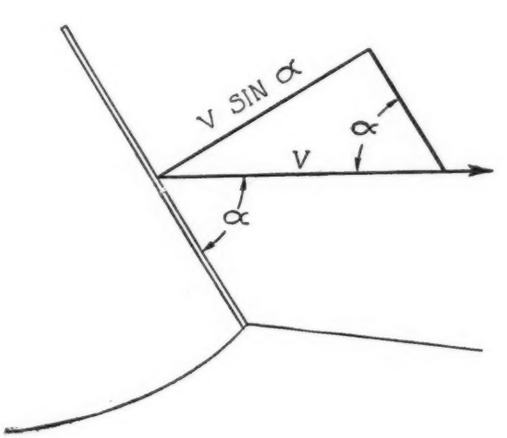


Diagram showing relative speed of impingement of or against tilted windshield

proportional to each other, as they inevitably are in large measure with the explosive type engine.

Of course steam power is the only solution, the one answer, the power that ought never to have been discarded for the will-o'-the-wisp internal combustion bogie, which has veritably led us over every kind of bog in trying to adapt by the addition of numberless auxiliaries and complications that which was inherently and fundamentally inadaptable.

**Efficient Accomplishment**

I do not deny the degree of success achieved, but engineering does not consist in merely accomplishing an end—it consists in accomplishing the end with the least possible expenditure of time, effort and money. Anyone could accomplish an end with these three factors at unlimited command.

I must further take issue with Mr. Clayden's remarks following that above quoted, not exactly as being incorrect, but as calculated to give a wrong impression. He says (page 821):

"A rough calculation shows that the Stanley steamer can exert a little more than 25 lb. per 100 lb. of car weight, for as long as a full pressure of 600 lb. can be held in the cylinder throughout the stroke, but actually this pressure is never available for more than part stroke, and nominal full stroke operation cannot be maintained without lowering the boiler pressure very quickly."

**Tractive Effort and Cutoff Not in Proportion**

I do not know whether Mr. Clayden's rough calculations covered the "mean" pressure with different points of cutoff, but it may suffice to state that if 25 lb. tractive effort (per 100 lb. of car weight) is obtained with taking steam for full stroke, 22½ lb. (or 90 per cent) is obtainable when taking steam for ⅝ stroke (using only 62 per cent of the steam used on full stroke), and 15 lb. (60 per cent) is obtained when cutting off at ¼ stroke, using only one quarter of the steam that would be used on full stroke. In other words the tractive effort does not fall anything like in proportion to the cut-off, owing to the expansion action of the steam in the cylinder. The above figures can easily be verified by consulting a table of m.e.p. in any engineering treatise. And the lowest of the above mentioned tractive efforts (15 lb.) is considerably above what the average gasoline engine will give.

The purpose of the above digression is to emphasize the point made at the opening of this article, namely, the misuse of the term horsepower, rather than to indulge in a discussion of the relative merits of steam and gas power. But little service is rendered by simply criticising one usage unless proposing something to take its place, and I therefore suggest the following to replace horsepower in automobile parlance:

The term selected must be short and significant. It must convey:

Driving effort over a wide range in all relations to:

Speed over a wide range.

I propose the term "Traction-factor," to be expressed and determined as below. The traction-factor value to be expressed by hyphenated numerals, the first representing the maximum driving effort and the second representing the speed at which maximum power is developed.

**Measuring Driving Effort**

The driving effort to be measured in pounds at the rim of the pair of driving wheels (thus embracing the variable due to gear ratios) and divided by the weight of car in hundred weights (thus rendering comparable the performance of cars of different weights). We will say this number might be 20.

The second number will be the speed in miles per hour, at which maximum power will be developed. We will say this might be 35.

The "traction factor" of this car will thus be 20-35. A heavy truck might have a traction factor 40-15, or a light racing automobile a traction factor of 30-65.

The values would be eloquent, and indicate at a glance the performance of the car. It is true they are arbitrary numerals, but so are all units of measurement. The relation in the mind between such units and the physical realities they represent grow out of usage.

Of course such a method of rating is not as completely eloquent as a graphic chart, but the latter is not generally understood, though its use should be encouraged wherever possible. But a verbal method of rating is necessary for general use, and this must be simple. With some little sacrifice of simplicity the above hyphenated expression might be amplified, to show other conditions, but it is questionable whether this would not render it too cumbersome for general adoption. Values selected for expression may not be those which most fully convey what is in the mind when we vaguely speak of "horsepower" of automobiles.

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# Queens Borough Automobile Center of East

"THE trend of automobile production and assembling is rapidly moving eastward, with a marked centering in the Queens Borough section of New York, where to-day there are forty-two automobile manufacturing, assembling, service and accessory plants," according to an article in the automobile number of *Queensborough*, the monthly publication of the Chamber of Commerce of the Borough of Queens, New York City.

The recent industrial survey of the Borough of Queens, by that organization, shows that the value of the products of these forty-two automobile plants for the year 1916 was $37,448,000, which also employed nearly 9000 persons. These manufacturers established in Queens for definite economic reasons—the comparative cheapness of production in assembling materials, the relation of the Port of New York for export and coastwise shipping; the rail transportation systems centering at New York, the large labor market made available by rapid transit extensions recently opened into Queens Borough. The development of the automobile industry in Queens started with the opening of the Queensboro Bridge in 1909.

**A Logical Centralization**

The reason for this centralization of the automobile industry in the East is entirely logical. Nine-tenths of the sales of all classes of automobiles in New York are made from the salesrooms along what is known as Automobile Row, being that portion of Broadway from Forty-fifth Street to Sixty-sixth Street, Manhattan, of which Columbus Circle at Fifty-ninth Street can be said to be the center. Fifty-ninth Street runs directly over the East River via Queensboro Bridge into Queens and is only a 5 or 10 minute automobile run between any of the plants in Queens and the sales center in Manhattan.

**Manufacturers Represented**

A partial list of the names of manufacturers established in Queens Borough includes the Packard Motor Car Co.; the Ford Motor Car Co.; the General Vehicle Co.; Pierce-Arrow Co.; Brewster & Co.; Studebaker Corp.; Simplex Motor Co.; Rainier Motor Corp.; Maxwell Motor Co.; Renault Frères; Delauney-Belleville, and Rolls-Royce.

In 1916 an illogical condition existed in the automobile industry, in that while only 6½ per cent of the total number of motor vehicles produced were manufactured in the East, 32 per cent of the total sales was made in the East, including those exported from Atlantic ports. That in itself would be sufficient reason for the location of manufacturing plants in the East, but the most important factor in automobile construction is the assembling of approximately two hundred and eighty different kinds of manufactured parts necessary to produce a complete car.

# Steels Used in Airplane Work—II*

## Tests Applied to Steels To Determine Their Various Physical Qualities, and the Relative Values of These Tests—Peculiarities of the Impact Test for Discovering Brittleness

By Dr. W. H. Hatfield

THE most directly useful and most used mechanical test is the tensile. The quantities usually measured are the yield-point, maximum stress, elongation per cent, and reduction of area per cent.

For many steels the yield-point is *not* a definite value, and the value put down for this item in a particular test depends on the personal factor and ideas of the operator. The method of determining the load which causes a sudden elongation, measurable with dividers, answers very well for a mild steel, but leaves a great deal to chance with the high-tensile materials—particularly when it is remembered that a pull of 65 tons per square inch on a 2-in. test piece will give 1/100 in. elastic elongation. In how many works tests does the operator have the load run back from about the yield-point position to try if there has been permanent set? If yield-point is to be taken as a guide as to the value of "true elastic limit," and if elastic limit is to be taken as the basis of design, then this quantity must have much more attention than it usually receives.

The "maximum stress," as generally understood, *i.e.*, $\frac{\text{maximum load}}{\text{original sectional area}}$ can as a rule be determined exactly. What the maximum stress signifies may not always be the maximum stress of which the material is capable. It has been shown that it is possible with a ductile material, by a simple modification of the shape of the test piece, to make it withstand a higher stress than the maximum as ordinarily determined. It would be an interesting addition to the data usually obtained from the tensile test if the actual breaking load per square inch of reduced cross section could be more frequently determined. There would be no difficulty in doing this with machines in which the adjustment of the jockey weight forward and backward on the beam is operated automatically.

The elongation and reduction of area per cent, which are usually taken as measures of "ductility," do not always increase or decrease together, and therefore do not indicate the same property of the material. In a test piece which has suffered marked local contraction the possibilities of the material are indicated by that portion which has been most severely strained, *i.e.*, near the fracture. Since the density of the material is almost unaltered by strain, the ratio of increased length to original length of the material very close to the fracture is practically the same as that of original area to contracted area. Hence percentage reduction of area is a better guide to ductility than elongation, and has the further advantage of being less dependent on the length of the test piece.

It would be interesting to have that property of the material discussed which is operating if there is considerable elongation taken up uniformly throughout the test length, *i.e.*, without local contraction. The phenomenon may be due to the "stiffening" of the material under strain. Thus, if there should be a slight accidental local extension accompanied by contraction, the increase of strength resulting from the strain probably makes these portions stronger than the rest of the test piece, in spite of the reduction of area. The straining which follows, therefore, takes place on the less strained parts. It may be that a careful study of the relationship between elongation and reduction might throw some light upon the relative manner in which steels will respond to stresses above their elastic limit. With materials which form a "waist" the "stiffening" under strain may still take place, but not sufficiently to compensate for the reduction of area.

In comparing different materials, it is only safe to take values from tests on bars of similar dimensions. The shape and size of the test piece affect in some measure all the quantities involved. Particularly is it almost hopeless to attempt to obtain measurements of elongation and contraction of area from tensile tests on a strip of steel to be comparable with tests from bars; in the first place, because of the variation in sectional area with the thickness of the sheet, and in the second place because the test piece is not properly machined and the results are materially affected by inequalities of any kind occurring on the exteriors of such pieces.

### Bending Test

The simple bend test is not appreciated, and is imperfectly understood. It may perhaps be useful to discuss it. If a square bar is bent to a very sharp radius, elastic deformation ceases after a fraction of a degree of deflection. During the plastic deformation there is considerable change of shape of the cross section of the bar at the plane of severest bending. The outside of the bend which is elongated naturally suffers reduction of area, both in width and depth. The inside of the bend, which is compressed longitudinally, receives a "bulging." The diagram shows the shape assumed by a 1-in. square bar of mild steel when bent to 180 deg., the smallest radius of the inside of the bend being approximately ¼ in. The local elongation of the outside of the bend approaches 100 per cent (reduction of area 50 per cent), decrease of width 29 per cent. The local compression at the inside of the bend is about 25 per cent, with an increase of width of 42 per cent. The surfaces of the bars are no longer plane, the transverse bulging on the inside of the bend being very marked. As bending proceeds, the position of plane of "neutral stress" is displaced toward the inside of the bend. The material which formed the original axis of the bar is, at a later stage, well inside the tension portion of the section. The angle to which a plane bar can be bent without fracture appears to depend on the ductility of the material. Thus, if the above-mentioned bar had only been capable of, say 25 per cent reduction of area, fracture would have commenced at about 90 deg. of bend. Provided very high tensile material (100 tons) can develop a sufficiently good reduction of area, other things being equal, it will bend to 180 deg.

In Fig. 3 a bending test is illustrated drawn from an actual experiment. On the compression side of the bend several "kinks" will be noted. The analysis of the material used in the experiment was: Carbon, 0.30 per cent; manganese, 0.58 per cent. This little test will indicate the intensity of local deformation which can be developed, and it only needs an alternating action to produce early rupture.

### Impact Test

Impact tests of the Izod and Charpy type were instituted with the object of detecting and measuring brittleness. The relative merits of materials in this respect are supposed to be indicated by the amount of energy absorbed in fracturing notched bars of particular form and dimensions. In the two machines mentioned the fracture is completed by a single blow from a swinging tup. These tests have the advantages that they are very simple in operation, and give easily observed values. The justification for their use, however, must lie in the amount of success which they have had in detecting brittleness of a dangerous nature, which was not already

*Paper presented to the Aeronautical Society of Great Britain, slightly condensed.

known or could not have been easily found from other tests, and of the use which they have been in preventing the employment of unsafe materials. In this respect the usefulness of the tests remains to be demonstrated.

### Tests Are Sensitive

The tests are very sensitive. They give widely varying results for different materials. Occasionally they give widely varying results for the same material, and, in fact, for the same test bar, the fractured sections being less than a couple of inches apart. The variability in the results for the same material, for no *apparent* cause, forms, in the opinion of the author, a serious objection to the test. The possible causes of variation, however, are many. An important cause is inaccuracy in preparation of test pieces. Extreme care is required to obtain exact dimensions, as slight errors give magnified differences in readings. Even with perfect test pieces variation is, in the author's opinion, an unavoidable feature of the test owing to the incidental circumstance as to how the microstructure is situated relatively to the bottom of the notch. In the Izod test the condition of the material close to the bottom of the notch is also a vital factor in the test. However, a flaw in the material is not always indicated by a low impact value. It may be the cause of high impact value, as when a crack runs parallel to the notched face. It is, therefore, advisable to examine the piece after fracture for any indications of these flaws, and particulars of impact test results should include description, and, if it were possible, the area of the ruptured piece.

After considering all the facts relating to impact tests on notched bars as at present carried out, the author is convinced that too much reliance is often placed on them and a much too ready interpretation placed upon the results. A high value is given by a steel in "good" condition, it is stated. But what, then, is a good condition? From what standpoint is it "good"? Is it because a maximum tempering effect has been obtained?

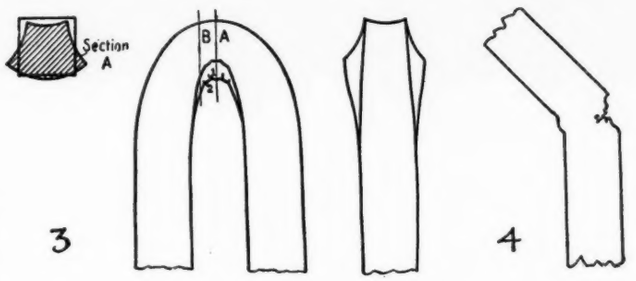
Examples could be quoted from practice of materials whose tests showed low impact values, but which worked satisfactorily over a long period under severe conditions. Until it is better understood what quality is really indicated by the impact value, and what are the causes of variations, it seems not only unnecessary but unwise to make too much of it. The tests may, in the future, perform an important service, but for the present the whole question should be left in the hands of unbiased investigators, to determine the real meaning of the tests, and to say what their service shall be. They will probably find their true value as auxiliaries to the tensile test, and then their mysterious value will have become quantitative.

A high impact value is usually obtained when the material is capable of absorbing considerable energy by "cold work," and an examination of fractures shows that cold working does not take place uniformly throughout the material, but is confined to relatively small regions. The distribution in the amount of "work" is surprisingly irregular. A severely worked portion may come almost in direct contact with an apparently unworked portion, the two regions being separated by a crack. It is difficult to trace the distribution of stress and strain which give rise to such a condition, but it seems reasonable to expect that when once a crack is formed it should become a surface of discontinuity with regard to subsequent straining. The position of the first crack and the direction in which it afterward extends must be largely influenced by slight local variations in the physical condition of the material.

### Hardness Tests

In Fig. 4 is a diagram of an impact test piece of wrought iron which gave an exceptionally high figure without being broken. The shape of the crack should be noticed. The well-worked material is only separated by a crack from material which is apparently undeformed.

The resistance of material to penetration, as determined by Brinell and Shore tests, gives a convenient check on the quality of the material, and can be readily applied for detecting local differences not indicated by the tensile test. The standard form of the first of these tests involves the determination of the size of permanent impression left after pressing a hard steel ball, of standard size (10 mm.), into a sample of the material at a plane surface, by a stated pressure (3000 kilograms). The hardness number is taken as the pressure per square millimeter of this spherical area.




Figs. 3 and 4—Showing deformation of section of test piece in shock test

### Shore Scleroscope Test

In the Shore scleroscope test the height of rebound is measured by a small diamond-tipped hammer falling from a standard height on to a prepared horizontal surface of the material to be tested. The hardness number which is indicated on the scale is proportional to the height of rebound. In this test a permanent impression is left on the face of the material, similar to, but on a smaller scale than, that of the Brinell. The reading of the machine depends on the ratio of the amount of energy absorbed in elastic deformation to that absorbed in plastic deformation. In distinction to the Brinell test, the actual pressure applied by the hammer in the Shore varies with the hardness of the material tested.

The two types of test agree fairly well with each other, and in some ranges with the maximum stress from the tensile test. This general agreement, even in a limited range, is useful in suggesting whether the tensile figures denote a proper test or a premature break due to flaws. When, however, we consider the whole range of mechanical properties in steel, the relation between the two tests and between each test and the tensile is not very rigid. The hardness numbers are not proportional to each other, although the Brinell number and maximum stress agree somewhat in this respect.

It has already been shown that there is very little agreement between hardness as determined by these methods and wear resistance, or machining properties of material, which properties therefore require special tests. Brinell hardness incidentally is not an infallible guide as to machining properties.

When dealing with hardened steels, the Shore is much more reliable than the Brinell, but really only applies to plane surfaces.

### Alternating Stresses

The majority of engine parts are subjected to alternating or fluctuating stresses. Many experiments have been made, in extension of the original experiments of Wohler, to find the endurance of material under such stresses in direct tension and compression, bending, and torsion. These have shown that the maximum safe stress depends on the range and speed of fluctuation, and have given rise to the approximate rule that by adding the "range" of stress to the stress at the maximum end of the "range" we get an "equivalent steady stress." Any such rule is only approximate, and from the special point of view of the airplane designer who wishes to get the best possible service out of the material consistent with safety, it is desirable that repeated stress tests should be made on all materials with which he has to deal which undergo such stresses in working. Such tests, however, would take up much time and attention.

Professor Arnold's "alternating stress tests," which can be carried out in a few minutes, combine the effects of alternating stress and shock. The actual stress employed is unknown. The test bar is fixed at one end, and by forces applied near the other end the bar is bent backward and forward through a definite distance, outside the elastic range, at a definite speed. The number of alternations withstood before

fracture is taken as a figure of merit for the material. It is, however, noteworthy that the value usually decreases as the maximum stress increases, but this would be expected.

The Stanton repeated impact machine applies alternating shocks to a notched test bar. The energy of blow is derived from the falling of a small hammer. The height of fall can be varied at will, but is kept constant during a test. The number of blows struck before fracture is automatically recorded. The total energy absorbed in producing fracture can be easily calculated.

**Torsion Test**

This form of test seems to be of particular interest to aero engineers, and the author is rather astonished that more attention has not been given to it in its simple form and many possible modifications.

Any shaft which transmits power suffers "torsion," and the natural method of testing the strength of such a shaft or of the material of which it is made should be by torsion. The amount of "torsion" acting at a section of a shaft or test piece is the total moment, about the axis, of the forces tending to twist one portion relatively to another at that section.

The stresses due to torsion over a normal section of a cylindrical bar are pure shear. For a solid section the shear stress (within elastic limit) is maximum at the skin of the material, and decreases uniformly to the center, where it is zero. The range of variation of stress is reduced by making the section hollow.

The stress strain diagram for the torsion test shows little, if any, "droop" from the maximum twisting moment. This is due to the absence of local contraction as it occurs in the tensile test. The plastic deformation in the torsion test takes place almost uniformly over the length of the parallel portion. The maximum stress in shear for any material is usually about 60-70 per cent of the maximum tensile stress, but the ratio is not a fixed quantity; hence the necessity for separate tests.

(*To be continued*)

# Clum Lighting and Ignition Switches Standardized

A LINE of lighting and ignition switch combinations that will meet the requirements of practically any automobile designer is manufactured by the Clum Mfg. Co., Milwaukee, Wis. Though incorporated in any desired panel or steering post assembly, as desired by the car manufacturer, the operation of the switch unit is standard, and simple.

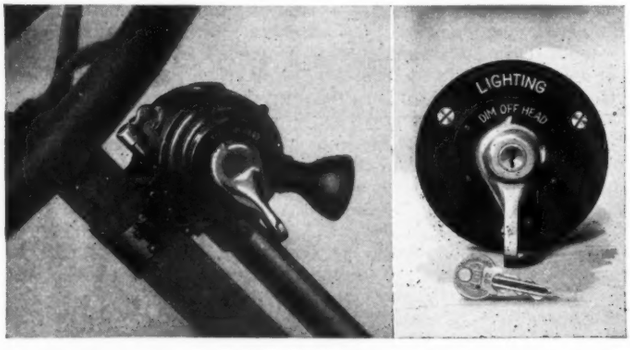
A torn down view of a representative switch is shown in the drawing. All wires from the electrical circuit are brought to a fiber back plate that is secured to the switch casing by a bayonet catch and a ground screw. By this, the terminals of the wires are held against bridging brushes carried in fiber plates held in the switch casing, and rotated by the switch handle.

In the drawing the outer brushes control the lighting circuit, and may be placed to give any desired combination of lights or light control. To change the combination it is only necessary to remove the bridging brushes, and place them in some other set of holes. It will be seen that all contacts are sliding contacts, and the operation of the switch is to simply bridge the ends of the wires attached to the back plate.

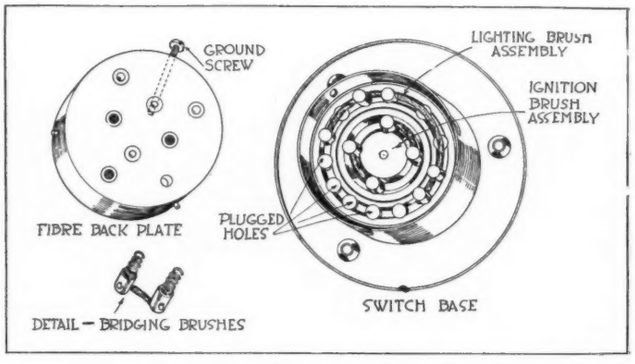
In the illustration, the inner set of brushes is in the ignition circuit, and is operated by a key. As the brushes are always rotated in the same direction, the direction of the current to the igniter is reversed at each operation. This tends to prevent building up or pitting the breaker points. A ratchet at the base of the ignition brush assembly makes rotation possible in only one direction.

As stated, the switches are incorporated in a wide variety of mountings. The present trend in passenger car practice seems to be toward one of two types—either the panel assembly, or the steering post control unit.

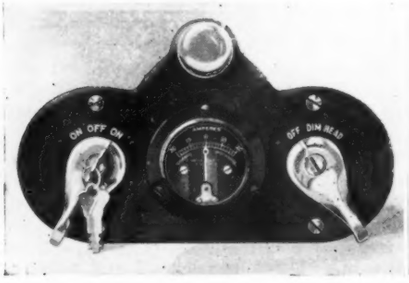
Though the Clum company manufactures the panels complete, any specified type of speedometer, meter, etc., will be incorporated. The panels proper vary in shape and general dimensions, depending upon the car in which they are to be used. At present there has been no step toward standardization of panel and instrument board layout.



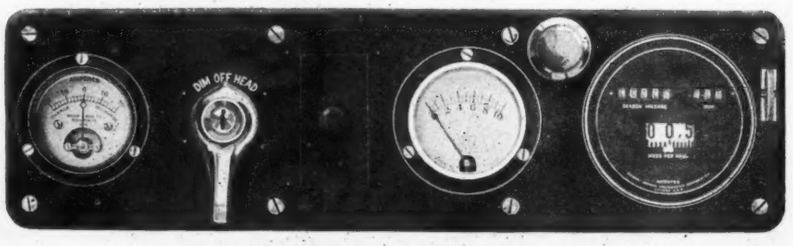

Left—Steering column type. Right—Combination lighting and ignition switch




Rear view of switch. Note method of bridging terminals




Type L L panel switch




Type C L L combination switch and instrument panel

# *How* The American Salesman Can Succeed Abroad

## *Things He Must Do:*

1—Be "Simpatico"—broad-minded, tactful, sympathetic.

2—Be aggressive but not offensive.

3—Make a preliminary study of people and country.

4—Study commercial geography.

5—Study the language of the foreign country.

6—Study international banking and credits.

7—Study international and foreign transportation.

8—Secure training in psychology.

9—Serve under an export expert.

10—Not "know it all."

SELLING abroad is NOT the same as selling at home. The salesman who sells in foreign lands must be an entirely different type. Things that "go" in the United States very often have a contrary result in other countries.

The merchandiser who hopes to make headway in foreign fields must not regard foreign selling as a haphazard, guesswork proposition. It is a science, even more so than is selling in our own country.

Failures of American products in other countries may be due more to the selling method than to faults in the product. It is not what you sell, but how you sell it.

It is even worth while, so experts state, to send a prospective foreign salesman on a three or four months' visiting tour of the country in which he is to work, in order that he may make a minimum of misfires and mistakes when he really begins work.

Selling abroad was deemed of such importance that it was assigned a place on the program of the recent World's Salesmanship Congress in Detroit, where E. H. Huxley, president of the United States Rubber Export Co., Ltd., New York, presented a summary of his experience in foreign sales work.

He first pointed out that domestic and foreign selling are vastly different, and that the foreign salesman must have special qualifications and training in addition to what is possessed by the domestic salesman.

"That the successful foreign salesman must possess special aptitude, and that the requirements are different from those of a domestic salesman, will undoubtedly be admitted without question," he said. "The successful foreign salesman is a specialist, and while he must, as all specialists must, possess the basic qualifications necessary in all successful salesmanship, he must go further, and *educate himself thoroughly in the special requirements which experience has shown to be essential if he is to be successful in foreign lands.*

"The shrewd, energetic, hustling salesman who often shines in the field at home is almost sure to fail abroad unless he forgets and leaves behind many of the tricks and peculiarities that seem to lead to success at home, and substitutes therefor the features that appeal to the average foreigner, and without which he is doomed to failure. The subject might be carried to almost any extent of subdivision and treated from the standpoint of the different foreign peoples among whom the salesman has to work.

"The man who may be successful, for example, in South America may be a failure in Europe or in Australia, and vice versa.

"The man who desires to become a successful salesman abroad must first realize that he has *much to forget and much to be learned* and that his success at home is not necessarily indicative of success abroad. He must train himself carefully and systematically, assuming that he has a fundamental aptitude for the work. The training should preferably be in and under the supervision, first, of some college or institution of learning that offers facilities for the work, and second, under the guidance of a trained commercial export company. The subjects he must be trained in may be specified as follows:

"1. Commercial geography.

"2. The language of the people among whom he is to work.

"3. A knowledge of international banking and credits.

"4. International transportation, including the necessary subdivision of all types of transportation insurance.

"5. A good training in psychology.

"While the above mentioned subjects may be considered as specific and essential, a thorough general education, preferably extending through the ordinary college course, is of invaluable assistance, if not necessary. *His clients will usually be trained, educated men* and in approaching them he cannot come with a better introduction than the refinements which education brings.

**Knowledge of Commercial Geography Essential**

"Assuming that the more general education is possessed, especial attention must be paid to commercial geography. We speak with derision of the foreigner who thinks he can travel from New York to Minnesota and transact his business, returning the same day, but none the less pitiable is the man who thinks he can run down to Buenos Aires from Rio de Janeiro for the week-end, or who contemplates working Australia in a fortnight.

"A company that sent a deaf mute to distribute its wares in this country would probably be accused of insanity, and yet the salesman who approaches a client in Spain without a knowledge of the Spanish language is in precisely the same position. The successful foreign salesman must above all things be prepared to converse fluently with his client in his own language, and while many of our friends abroad are able to speak English, this fact must not be assumed, and in any event it is certainly easier for the foreigner to use his native tongue, and the subtle compliment of carrying on a business conversation in the desired customer's language is very real and cannot be exaggerated.

**Should Speak Native Language Fluently**

"The knowledge of the native tongue should not be superficial but thorough, and the ability must be present to converse fluently, and it is far better to spend three months among the people whose business is desired, *doing nothing but perfecting oneself in the language, than to attempt business when ludicrous mistakes may be made or when an important point in a contract cannot be discussed for lack of words.*

"The completeness with which international banking and credits must be studied depends upon the position which the candidate is to fill. The man at the home office in whose charge these matters specifically come must, of course, be an expert, but the salesman on the spot in the field must be able to discuss various terms of payments with his clients and do so intelligently. The same applies to transportation and insurance, as here also the man in the field must be able to speak intelligently of this phase of the business.

**Psychology an Important Requirement**

"Psychology is most important, for it involves a knowledge of the human mind. We are accustomed to refer to selling goods as a battle of wits, and if this be so, the successful salesman must be able to read and cope with the mind of his most expert customer, whether that customer be an American, a Spaniard or a Frenchman, and he *must be ready to take quick advantage of slight turns which may lead to success.*

"Having completed successfully the scholastic part of his training, it may be superfluous to emphasize the necessity of a thorough knowledge of the wares and products which he is going to sell and an equally thorough knowledge of the methods and policies of the company that he is going to represent. It is bad enough for a salesman to compete against a buyer in this country who knows more about his wares than he himself does, *but it is fatal if this condition exists abroad.*

"It is seldom that a company is able to find a salesman who is trained academically for export work and who knows the country to which he is going and who in addition is familiar with the company's products and policies. Sometimes one or the other may be found ready-made, but seldom both, and it therefore becomes necessary to train the candidate in at least one of these two essentials and sometimes in both.

"Supplementing the factory training, the candidate should spend as long a time as is necessary in the main office of the company so that he may familiarize himself thoroughly with their customs, methods and policies, and especially so that he may bring himself into line and sympathy with these policies.

"The salesman, having undergone the academic training, supplemented by the company training, should be prepared to start his work in the field. That he is not a finished product when he begins is, of course, clear, but with his fundamental training he should quickly assimilate himself with the people and adapt himself through experience so that he may successfully prosecute his work.

**Should Have Natural Aptitude**

"I have not to this point made mention of any natural aptitude which the candidate should possess for the work; this is, however, by no means unimportant; in fact, on the contrary, it is highly essential, and in selecting candidates a careful study of a man's natural qualifications should be made.

"A man should possess tact in large measure and should be a good mixer, not in the sense that the term is ordinarily used with us in this country, but in the sense that he must adapt himself to the people among whom he is to work, and become, as nearly as may be, one of them. He must think as they do, sympathize with their views and be thoroughly persona grata to them, or, as the Spanish express it, he must be 'simpatico.'

"Too many of our unsuccessful salesmen start out with the theory that they *know it all* and that the foreigner is *more or less a savage who must be taught the fundamentals of doing business;* this is fatal to success, and even if the salesman does know more about business than his client or desired customer, he should carefully keep that feeling to himself and in no event indicate in the slightest degree to his client that he has other than the highest opinion of his methods and his business ability.

"The utmost courtesy prevails almost universally among foreign business men and the successful salesman must have due consideration for and give due weight to all the niceties of transacting business.

"The broadest possible conception and viewpoint of all fundamentals must prevail and there is no surer way of broadening a man who has heretofore confined his work to his own country than to travel. The time and money expended in a three or four months' trip is well spent, *even if nothing is done other than travel apparently for pleasure.*

"A trip among a foreign people, even if it is only to nearby Cuba, is of the greatest possible aid and contributes in very great measure to the preparation and education for the work in hand.

"Foreign selling is not a haphazard matter or a matter of chance or of accident. The candidate must have natural aptitude and tact and then he must be carefully trained and an ideal foreign salesman may be quite properly placed on a par with a carefully trained specialist in any profession."

# Latin America Restricted Truck Market

## Poor Roads and High Cost of Gasoline Prevent Rapid Increase in Sales

By Manuel Gonzales

*Manager Latin-American Department, National Association of Manufacturers*

BEFORE the year 1913, very few countries in Latin America had any motor trucks in use, for the following reasons: Lack of good roads, lack of expert chauffeurs, lack of shops for repairs and the high price of the vehicle. The only countries where it was possible to run the motor trucks and keep them in good condition were Argentina, Brazil, Chile, Cuba, Mexico, Peru and Uruguay, and we can estimate that in the seven mentioned countries there were not more than 100 trucks in all, at least 50 per cent of which had been discarded by 1913; consequently by Jan. 1, 1913, there were only fifty motor trucks in use in all Latin American countries.

**Roads in Poor Condition**

In the majority of the Latin-American countries, and especially in those within the tropics, the highways are in very bad condition, due to the heavy rains which destroy them, notwithstanding the large amount of money spent on repairs during the short dry season. In all Central America, Panama, Colombia, Ecuador, Bolivia, Venezuela, the southern part of Mexico, Haiti and Santo Domingo, roads during more than half of the year are impassable, even for ox-carts. The topography of those mentioned countries and of Peru, Chile and a large part of Brazil has necessitated the construction of roads through deep ravines, up mountain slopes and rocky hills, crossing rivers and having to climb from the level of the sea to the high plateaus, sometimes 6000 to 10,000 ft. in the short distance of from 100 to 300 miles.

Motor trucks are used for interurban service, and since the year 1913, some 400 have been exported from the United States alone to fifteen of the twenty Latin-American Republics. Consular reports show that in several of those countries roads connecting the principal cities have been repaired in order to make them available for the service of automobiles.

Another thing which makes the use of motor trucks not very popular is the high price of gasoline. There is no country in South America where gasoline costs less than four times the price paid in New York, and in several instances, even six times as much; and when to the great expense of this indispensable commodity one adds the high salary of the driver and the very high price charged for the simplest repair, it is not surprising that more trucks are not imported.

The motor truck which will have a good market in those Latin-American countries in the very near future is the electric truck, as in those countries large and powerful electric plants are being established taking advantage of the immense wealth of water power they possess. Electric motor trucks, of no more than 2 tons, will soon find many buyers in Argentina, Brazil, Peru, Uruguay, Chile, Cuba, Colombia and Venezuela. The other countries, Bolivia, Ecuador, Paraguay, Panama, Central America, Santo Domingo and Haiti, will for many years to come be customers of only small importance.

The following figures show the number of commercial vehicles exported by the United States to Latin America since 1913.

| Countries | 1913 | 1914 | 1915 | Total |
|---|---|---|---|---|
| Mexico | 35 | 12 | 8 | 55 |
| Cuba | 14 | 19 | 21 | 54 |
| Dominican Republic | 1 | 1 | 2 | 4 |
| Haiti | 3 | .. | .. | 3 |
| Guatemala | .. | .. | .. | .. |
| Salvador | .. | .. | .. | .. |
| Honduras | 1 | .. | 6 | 7 |
| Nicaragua | .. | .. | .. | .. |
| Costa Rica | 2 | 8 | 2 | 12 |
| Panama | .. | 5 | 6 | 11 |
| Colombia | 3 | .. | 1 | 4 |
| Venezuela | 23 | 12 | 3 | 38 |
| Ecuador | 1 | .. | .. | .. |
| Bolivia | .. | .. | .. | .. |
| Brazil | 36 | 13 | 3 | 52 |
| Uruguay | 7 | 1 | .. | 8 |
| Paraguay | .. | .. | .. | .. |
| Peru | .. | 3 | 2 | 5 |
| Argentina | 35 | 48 | 3 | 86 |
| Chile | .. | 2 | .. | 2 |
| Totals | 161 | 124 | 57 | 342 |

**MOTOR TRUCKS—DUTIES IN SOUTH AMERICA**

| Countries | Duty | Surtax |
|---|---|---|
| Argentina | 10 per cent ad valorem | 2 per cent ad val. |
| Brazil | 5 per cent ad valorem | 0 |
| Chile, kilo gross | 0.20 ($0.0666 American gold) | .. |
| Colombia, kilo gross | 0.01 gold | 2 per cent on duty |
| Ecuador | Free | .. |
| Bolivia | Free | .. |
| Uruguay | 10 per cent ad valorem | 8.65 per cent ad val. |
| Paraguay | Free (for 2 years up to Nov. 8, 1917) | .. |
| Peru | Free | .. |
| Venezuela | 69 cents American gold per 100 lb. gross | .. |

Chile—Automobiles—1914, $425,000; 1915, $307,000. Punta Arena, 1915, $88,000 from U. S. A. and $9,000 in automobile parts.

In 1914 the importations were:

| | Cars | Parts |
|---|---|---|
| From Great Britain | $76,000 | $3,000 |
| From Germany | 73,000 | 1,000 |
| From France | 67,000 | 2,500 |
| From Belgium | 4,000 | 200 |
| From Italy | 22,000 | 300 |
| From U. S. A. | 123,000 | 22,500 |
| From Argentina | 60,000 | ..... |
| | $425,000 | $29,500 |

**U. S. EXPORTS TO CHILE**

| | 1913 | | 1914 | | 1915 | |
|---|---|---|---|---|---|---|
| | No. | Value | No. | Value | No. | Value |
| Automobile, passenger | 78 | $110,000 | 195 | $123,000 | 120 | $64,000 |
| Automobile, commercial | 0 | ..... | 2 | 11,000 | 0 | ..... |
| Automobile, parts of | | 5,000 | | 22,500 | | 15,000 |
| Automobile, tires | | 3,000 | | 11,000 | | 21,000 |
| Totals | | $118,000 | | $167,500 | | $100,000 |

Duties—Passenger cars and parts, gross kilog., $0.22, up to 1000 kilos, and $0.15 per kilo exceeding. Commercial vehicles, gross kilog., $0.07⅓ per kilo.

# El Automovil Americano for July Covers Automotive Field

THE July issue of *El Automóvil Americano*, an automobile publication printed in Spanish for all Spanish-speaking countries, is particularly valuable and should do a great deal toward familiarizing the Spanish-speaking countries with the automotive industries of the United States.

A valuable feature of the paper is the common-sense advice given with regard to the necessity of road construction in all Latin-American countries and telling how different types of roads are built. There is one article of special importance which should be of good service to American manufacturers, namely, The Care of Pneumatic Tires, which gives detailed instructions on the care tires should receive not only when in use, but while being carried in stock. There are some excellent articles dealing with the capacity of the different types of motor trucks and Ford adapters. In all Spanish-speaking countries there is a good field for these types of vehicles. The interest of the dealer in the Spanish-speaking countries is well shown by the many illustrated pages of accessories.

*El Automóvil Americano* is to be congratulated on the way in which it is presenting the automobile, tractor, truck, motorcycle and airplane industries in America to the dealers in these lines in Spanish-speaking countries.

The Automobile and Automotive Industries

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# Start Airplane Production

ALTHOUGH for months there has been talk of a big schedule of Army airplane production and that most of the contracts would be let to automobile manufacturers, the latter did not know exactly where they stood. Airplane engine manufacture requires about the same skill and experience as the manufacture of the better class of automobile engines, and it was therefore only logical that this work should be assigned to the automobile industry. But an automobile plant cannot start manufacturing airplane engines without changing its equipment. For efficient production under modern conditions the tools must be very closely adapted to the work in hand, and therefore a good deal of new equipment will be necessary in practically every case. As long as no definite action had been taken by Congress regarding the airplane proposition, manufacturers naturally were not prone to make investments in tools and other equipment, for they had no guarantee that the program would not be canceled or at least materially cut. Now, however, that both houses of Congress have passed the bill and the designs of the U. S. motor, to which production is to be largely confined, are practically completed, nothing remains to prevent automobile manufacturers from beginning active preparations to share in the work of building our great aerial fleet.

# Standardized Trucks

SECRETARY OF WAR BAKER, by approving the expenditure of a large sum of money to provide the army with an absolutely standardized motor truck equipment has at one stroke placed the army which America is now raising far ahead of any other in the matter of road transportation.

Individual manufacturers of very high standing have stated in black and white that they were, if necessary, prepared to design, build and be ready to supply completely new vehicles, in accord with the specifications, within four to five months; and to guarantee those chassis for one year. Thus it is certain that the concentrated effort of the whole truck industry will be able to do considerably better than this. The first of the standard military trucks will be on the road before the end of the hot weather.

There has been opposition to the idea of a standard military design ever since the idea was first put forward. Beginning by opposition from nearly all the trade it has changed steadily, till there are to-day scarcely as many manufacturers as can be counted on the fingers of one hand that are not heartily in support of the War Department's scheme.

### Standard Trucks Possible

The use of standard designs for military trucks is absolutely as sensible as the use of standard types for arms of any kind. To ask troops to fight with twenty kinds of transport vehicles is only a shade better than to expect smooth operation with twenty different kinds of rifle and twenty different sorts of ammunition. There is one reason and one reason only, why the armies of France and England have not got standardized motor trucks. This is that they were so situated in the early months of the war that they could not pause an instant for the sake of benefit later on. From the start of the war they have not had an opportunity to standardize their motor equipment, they have merely been able to reduce it little by little to a smaller number of types than what they had in August, 1914.

America has, in a sense, plenty of time. The number of men that can be sent abroad to fight before next spring is comparatively small; so by the time the draft armies are trained standard trucks will be available in any quantity. These trucks, being designed by the combined brains of the industry, being designed with a full knowledge of all the multifarious faults which have developed in the trucks in European service to-day, cannot fail to be the very last word in engineering. It is significant that British truck papers have commented upon the War Department's specifications as being the obvious result of "European front experience, plus Mexican experience, plus the general advance in automobile engineering since 1914."

England and France are still using designs of truck which were old in 1914. They have been unable to make a change, because of the spare part and maintenance problems; but this does not mean that they would not like to change. Far from it, as proved by the great effort made by the British Ministry of Munitions in 1915, to evolve an absolutely

standardized truck; an effort that had to be abandoned merely because the little truck industry of England could not undertake to make good the losses in France and get out a new type simultaneously.

**Manufacturers Are Ready**

America can easily do all that is needed. The old-line makers have capacity to supply all the trucks which will be needed up to the end of this year, or even longer. By Jan. 1 the standardized trucks will be available in any quantity. If America's first expeditionary force goes over with an equipment similar to that of the Allies, America's really great army will be able to have a better article. A better article from the viewpoint of performance and a better article from the maintainance point of view.

This standardized truck has been made possible by the Society of Automotive Engineers, by the years of standardization work that the society has done. The society, being a deliberative body and not a ruling one, could not have carried things much further. The authorities have stepped in at absolutely the right moment, have taken over the responsibility which ultimately had to be theirs, at precisely the right time. The society has shown the industry, or rather, has led the industry to see for itself, what can be done, and the War Department has now taken the responsibility for providing the machinery with which to do it.

The engineers who have volunteered their services will be called soon after the time these words appear in print. From the many who have offered their help a number will be selected large enough to insure a proper threshing out of points of design, but small enough to insure quick action. The result of the work of the smaller groups will be submitted to the whole before any parts are made. Everything is to be done in the most widely open manner possible, and the criticisms of every engineer are sought.

**Testing the Trucks**

The trucks which will soon be built to the War Department specifications and the design of the combined truck engineers of America will not be accepted till proper tests have been made. The money set aside for the work provides ample funds for the building of alternative types, so that the most severely debated points can be settled by actual trial. Day and night running on the road, plus continuous operation block tests for the engines, will soon prove the correctness or otherwise of the first draftings.

The most hotly argued feature of design of all, the type of rear axle, is to be settled in this way. Probably the type of steering will be made final in a similar manner. Engines may be built with small variations in design, different radiator types may be tried, and so on. On the whole there is but little disagreement apparent with the main points, so far it is mainly in the smaller detail that argument has been fiercest.

This is most fortunate, as it will prove much easier to change these small points in design before manufacture on a large scale begins than it would be to make radical alterations.

# The Fuel Situation

TWO rather significant events bearing on the fuel situation occurred during the past week. One was the issuance of a report by the Committee on Petroleum of the Council of National Defense which called attention to the scarcity of gasoline and recommended the curtailment of pleasure driving, the other was the passage by the Senate of the Pomerene amendment to the Food Control bill giving the President sweeping powers with regard to the production, transportation and sale of all kinds of fuel. This latter, taken together with the recent report of the Federal Trade Commission on its investigation of the cost of producing gasoline, would seem to foreshadow Government control of the price of fuel.

**No Alarm Intended**

The report of the Committee on Petroleum has tended to create a rather pessimistic feeling in a section of the industry. It should be remembered, however, that no suggestion is made that pleasure driving be stopped by compulsion. The suggestion of the committee not to use cars unnecessarily is simply another version of the general plea for economy that has been made in various forms since the country entered the war. Compulsory stoppage of all pleasure driving would work untold injury to many lines of business, including all summer resorts, hotels, garages, etc. Pleasure driving is a healthful form of recreation for which there is the more need the greater the application of a man to his business. For the present season at least, the need of the Army for motor fuel is not very great. It may seem alarming that the country is using up its reserve stock of crude oil, yet it must not be lost sight of that, with the exceedingly heavy exports and with the activities of our own Army, the conditions are abnormal, and even if the present rate of depletion of our reserve stocks should continue these would last for about 5 years.

**High Price a Natural Restriction**

It is interesting to note that although the report of the Committee is corroborated by Van H. Manning, director of the Bureau of Mines, not all of the petroleum interests agree with the suggestion that pleasure driving be curtailed. Thus it is pointed out that the Government expects to buy fuel oil at 2 cents a gallon and it is the passenger car driver who willing pays 30 cents per gallon of gasoline, who pays for the cost of sinking new wells, which is constantly increasing, and at the same time makes it possible for the Government to buy fuel oil at this amazingly low price. There is no doubt that the present price of gasoline tends to restrict the use of the fuel to a considerable extent. There would be very much more unnecessary driving if the price of gasoline was one-half what it is. This, it would seem, is the only restriction required for the present. There are comparatively few cars that are used for pleasure driving exclusively and there will be less inclination to "joy-riding" in the serious times ahead. All cars available for service will be kept running however.

# News of the Automotive Industries

## Economy in Gasoline Urged

### Petroleum Committee of National Defense Advisory Commission Suggests Reduction in Consumption for Pleasure Purposes—Resources Ample, But Demand Exceeds Production

NEW YORK, July 24—Strict economy in the use of gasoline, efforts on the part of the producers to increase oil production to the utmost and fair minded treatment of the producers by the Government are advocated in a report just issued by the Committee on Petroleum of the Advisory Commission of the Council of National Defense. This committee, of which A. C. Bedford, president of the Standard Oil Co. of New Jersey, is chairman, was appointed to mobilize the petroleum industry so as to render its conduct most efficient for the purposes of the war. In the report the view is expressed that if pleasure driving and all unnecessary use of automobiles are curtailed and producers are encouraged to do their best, there will be gasoline enough to meet all normal requirements and to supply the needs of our Government, of our Allies and of American industry and private users.

Similar ideas were expressed by Van H. Manning, director of the Bureau of Mines, before the Editorial Conference in Washington, as reported in THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES for May 31.

**PETROLEUM PRODUCTION**

1917 AS COMPARED WITH 1916

| | |
|---|---|
| Appalachian field | No change |
| Lima, Ind., field | —8½ per cent |
| Illinois field | —1,000,000 bbl. |
| Kansas and Oklahoma fields | —1,000,000 bbl. |
| North Texas field | +2,000,000 bbl. |
| Caddo, La., field | —2,000,000 bbl. |
| Gulf Coast field | No change |
| Wyoming field | No change |
| California field | +2,000,000 bbl. |

#### Plenty of Petroleum

It is understood that the chief object which the committee had in view in drafting its report was to encourage production. Some of the statements made in the report are rather depressing from the standpoint of the industry. The impression is conveyed that there will be no increase in gasoline production during the current year. However, it is realized that there is plenty of petroleum in the ground, and that it is merely a question of getting it out and refining it. If the fuel is really needed it will be produced. The exhortation to motorists to avoid unnecessary use of gasoline is merely a counterpart to the requests made of all loyal citizens to economize in food, clothing and other necessaries of life, so as to conserve our energies for the big struggle upon which we have entered. Of course, the committee also takes occasion to forewarn the Government that if oil is to be produced in sufficient quantity a fair price must be allowed the producers. This matter of the price of petroleum products has been under investigation by the Federal Trade Commission, and a wrangle between the Government and the oil interests over prices is in prospect. Some people profess to see in the report issued by the committee a prelude to an extensive price-boosting campaign. Whether these predictions are correct time only can tell. Following is the report as issued:

"In view of the abnormal conditions confronting the nation by reason of the war, it is peculiarly important that the country should understand the serious situation now prevailing in the petroleum industry.

"This country is producing crude oil at the rate of about 300,000,000 barrels a year, but it is using it at the rate of 335,000,000 barrels a year. The amount of crude oil in storage, all grades, May 1, 1917, was 165,688,797 barrels. The country is absorbing the entire current production and drawing very rapidly upon its reserve supplies.

"The rapid development of the automobile is largely responsible for present conditions. In 1910 there were 400,000 automobiles in use in the United States; in 1916 the number was 2,350,000. Today there are more than 4,000,000 cars, demanding over 40,000,000 barrels of gasoline a year. Other uses of gasoline and oil are expanding upon an enormous scale.

#### Oil Products in Great Demand

"The demand for oil products is greater than the supply of crude oil. Because of the demand, the price of crude has risen, thus stimulating more and more producers to drill new wells. Though this drilling has been going on with great aggressiveness—because the cost of drilling is much greater than in the past and the total successes fewer than ever—the returns from such efforts are not as satisfactory as they were a year ago. In the first three months of this year 471 wells were completed, yielding an initial production per day of 344,876 barrels. In 1915, 1711 new wells yielded about 439,010 barrels.

"In other words, though there have been almost three times as many new wells drilled in 1917 as in 1915, the initial production is considerably less than in 1915. The drilling of wells is still going on, but thus far there has been no increase in production over last year or the year before.

"The meaning of the foregoing is this: If our Government is to have the petroleum it will need to prosecute the war successfully, and supply all necessities directly growing out of the war, two steps will have to be taken, namely:

"1. The public will have to economize in the use of gasoline. Sufficient gasoline should be available to provide for all the normal uses of automobiles. But pleasure riding should be curtailed. People should look upon their automobiles as necessities to be used only when needed. Not a gallon of gasoline should be used in the present emergency except for some useful end.

"2. Every oil producer in the country should be encouraged as a patriotic effort to secure the utmost possible output of crude oil. The present expense of drilling new wells is very great and increasing, and the results are often discouraging. But there is oil to be had if producers in the oil business will redouble their efforts to get it out of the ground.

#### Supply Should Be Ample

"I have the utmost confidence in the spirit with which the Government will meet this problem in the matter of the price, which is now being investigated by the Federal Trade Commission. With proper economy on the part of the public and with sufficient co-operation and effort on the part of oil producers, there should be ample oil to supply the needs of our Government, of our Allies, of industry in this country, and for domestic use.

"The petroleum industry has gone into this situation whole-heartedly and with an eye single to assisting the Government in its stupendous problem, and I am convinced that the Government on its part will meet the situation in a liberal and broad-minded spirit, and that a just price will be paid, sufficient for the maintenance and development of in-

(*Continued on page* 167)

# All Fuels Controlled by President

## May Mean Fixed Prices—Government Contract Bill Amended by Senate

WASHINGTON, July 24—President Wilson is given complete control over the production, transportation, distribution, storage and sale of coal, coke, petroleum and all their products, according to an amendment to the food control bill handed in by Senator Pomerene of Ohio and passed by the Senate. The impression here is that the House conferees will agree to this amendment.

Its essential provisions are:

1—The President may establish rules and regulations governing the production and sale of these products.

2—If any dealer or producer fails to conform to these rules and regulations the President may take over and operate the property of these persons.

3—The President may require all producers to sell their product to the United States through a designated agency which shall regulate the re-sale and fix the compensation paid to the producer.

4—Compensation to be paid for property and products thus taken over shall be based on the cost of production, including maintenance and depletion charges to be determined by the Federal Trade Commission. If this settlement is unsatisfactory the producer or dealer may sue in the United States courts.

5—The Federal Trade Commission, when directed by the President, shall make a full inquiry into the price of producing fuel products and for that purpose shall have access to the books and records of persons and companies producing or distributing coal or other fuel products.

6—The President is authorized to fix maximum prices based on this inquiry which must be observed by all producers and dealers. Heavy penalties are provided for violations of any of the terms of the Act.

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### Export License Program Completed

WASHINGTON, July 24—The program which is followed by the Division of Export Licenses of the Department of Commerce when an exporter applies for a license to ship abroad an article or articles on which an embargo has been placed by this Government is as follows:

Two copies of every export license are given to every applicant who is granted the license. He, in turn, delivers these licenses to the steamship company handling the shipment, and the steamship company in turn, deposits them both in the custom house with the manifest. This enables the custom house to keep one copy for its records. Another copy goes forward with the ocean documents to destination, and the stub of the original is returned by the custom house, properly filled in, so that the Division of Export Licenses can check back what shipments have been made against the license issued.

If only part of the goods licensed are shipped on a specific steamer, it is contemplated that some arrangement will be made which by a "balance license" bearing the same expiration date as the original, will be procurable. The license forms are now all ready and will be issued during the week beginning today.

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### Aerial Mail Carriers in Mexico

MONTEREY, MEXICO, July 20—According to information that has been received here the recent establishment by the Department of War and Marine of the Mexican Government of an aerial mail line between the City of Mexico and Pachuca, a distance of 110 miles, is the forerunner of a very extensive system of carrying the mails by biplanes that is to be inaugurated in this country. Although the machines were built and are operated under the direction of the Department of War and Marine, the Postoffice Department is in charge of the laying out of the routes and other matters connected with the new branch of service.

Each of the machines now in service is capable of carrying 500 lb. of mail. The biplanes are of Mexican manufacture, but whether they are made from a new type or are patterned after existing machines is not known here.

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### Italian Plane To Carry 40 Men

NEW YORK, June 19—Italian scientists have designed and have under construction a plane of 3000 hp., capable of carrying forty people, according to Major Terfetti, of the Royal Italian Flying Corps, in an address last night at the Automobile Club of America. The Italian army, he declared, now has an airplane which makes 139 m.p.h., a seaplane making 112 m.p.h., and an airplane measuring 100 ft. from tip to tip. All of the planes used by the Italian army are constructed of raw materials shipped to Italy from America.

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### Fireproof Varnish for Airplane Wings Successfully Tested

NEW YORK, July 20—A varnish, rendering fireproof the highly inflammable linen wings of airplanes, has been brought out by Parker R. Bradley, a chemist associated with Weeks & Co., importer and exporter. A flaming torch was applied to a standard airplane wing that had been treated with Bradley's preparation and later covered with gasoline. The frame was enveloped in flames, but the blaze quickly subsided, leaving the wings and frame slightly charred but intact.

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### Wilbur Wright Flying Field Opened

DAYTON, July 23—Formal dedication of the Wilbur Wright federal flying field took place last week, when Capt. A. R. Christie made a 10-minute flight in one of the new instruction planes. Eleven students have arrived from Ohio State University and actual work has begun.

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### U. S. Airplane Plant for Mt. Clemens

MT. CLEMENS, MICH., July 24—Current rumors prevail that the $1,000,000 airplane plant reported about to be erected in Detroit by the Government will be erected in Mt. Clemens near the Selfridge Aviation field, on the shore of Lake St. Clair.

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### Soliciting Contracts Prohibited

WASHINGTON, July 24—The Senate has adopted an amendment by Senator Pomerene of Ohio prohibiting the members of the advisory committee from soliciting or attempting to induce any officer of the government to execute a contract for the government with a concern in which he is interested. It does not, however, prohibit the making of a contract with such firm.

# Airplane Bill a Law

## President Signs $640,000,000 Appropriation Bill—Plants Ready for Work

WASHINGTON, July 24—The airplane appropriation bill is now a law, having been passed by the Senate in the closing hours of the session on July 21 and signed by President Wilson to-day. It was disposed of by the Senate within little more than 1 hr., and was passed without roll call. Only one amendment offered to it in the Senate was debated at any length, that by Senator La Follette, of Wisconsin, which would have amended the section giving the President authority to draft enlisted men and officers for the aircraft fleet.

### Airplane Industry Expansion

With the authorization of an expenditure of hundreds of millions for an aerial fleet, which, according to estimates, will comprise approximately 22,000 airplanes, the airplane industry of the country will have to be enormously expanded. At the present time the largest airplane factory in the country is that of the Curtiss Airplane & Motor Co., Buffalo, N. Y., which has a capacity of thirteen engines per day. This concern is now working on a British contract which is being filled at the rate of three engines per day. Hence the capacity which can be devoted to work for our own Government is limited to ten complete airplanes per day.

Anticipating the great demand for airplanes that will now follow the passage of the airplane appropriation bill the company has already taken steps to greatly increase its capacity, and before the end of the year its output will be doubled. A large block of stock has been marketed recently, so that there will be no dearth of working capital. John N. Willys has been appointed president of the Curtiss company, whereby the company has become closely allied with the Willys-Overland Co., which is also working on airplane engines, and an aggressive management is therefore assured.

Next in importance in the airplane engine field at the present time is the Wright-Martin Aircraft Co., which is building Hispano-Suiza aircraft motors in the old Simplex plant at New Brunswick, N. J. While the present output is only four engines per day, the company expects to increase its production to ten motors per day before the end of the year. This company has recently acquired the plant of the Domestic Engineering Co. of Dayton, Ohio, in which it will turn out complete airplanes. Ample capital has been obtained by the sale of 500,000 shares of common stock at $5 per share.

In addition to the above concerns already engaged in the manufacture of airplane engines, many of the leading automobile manufacturers will shortly

enter upon the same line of work. In fact, the Nordyke & Marmon Co. already is doing work along this line, having entered into a contract for the manufacture of the Hall-Scott airplane engine. For this work a new building is being constructed by the Marmon company which will be completed before the end of this month.

While the manufacture of airplane engines is closely related to that of automobile engines and a large number of plants are available whose personnel is familiar with the class of work required, it is different with respect to the manufacture of airplane bodies. These embody principles of construction which are not duplicated in any other present line of manufacture. It is very likely, however, that manufacturers of automobile bodies will get some of this work, and a report is current that negotiations are under way between the Fisher Body Corp. and the Airplane Production Board regarding the manufacture of airplane bodies. In a recent report of the Fisher Body Corp. its entrance into the aircraft field was foreshadowed, and it is understood that considerable preparatory work has been done. It is estimated that the body of the airplane, including the fuselage and the wings, accounts for about 50 per cent of the total cost.

### Coffin Says All Is Ready

Howard E. Coffin, chairman of the Aircraft Production Board of the Council of National Defense, following the signing of the aircraft appropriation bill by President Wilson, discussed the situation which now confronts the United States and the need for co-operation on the part of manufacturers and others with the program for carrying out the provisions of the bill, as follows:

"The program for which $640,000,000 has been provided by the aircraft bill must be carried out with a promptness equal to that displayed by Congress in passing the measure. It is a task demanding all the initiative and power of American industry for its consummation, and, just for that reason, one to which the nation will respond. All world's records for industrial development of a new art must be broken. Whatever crimes may later be laid at the door of those who are to direct this work, that of inaction or slowness in accomplishment must not be one of them. *We are prepared to go ahead at once with the expanded plans which the appropriation makes possible.*

"One word of caution only need be said here. Time, material and organization are the main elements in any manufacturing industry. Under ordinary conditions at least a year would be required for the industrial preparation which this program demands. Yet we have no such length of time in which to perform the task now. In every other country there is a shortage of materials for aircraft construction. In every other country there is a shortage of the type of men required for the air service. In spite of our previous inexperience in quantity production of fighting planes, we must have thousands of them for next year's use to make the contribution which the Allies expect of us.

(*Continued on page* 173.)

# U. S. Orders 24,050 Truck Bodies

## War Dept. Lets Contracts—10,000 to International Harvester Co.

WASHINGTON, July 24—The purchasing department of the Quartermaster's Corps has let contracts for 24,050 motor truck bodies, 10,000 of these going to the International Harvester Co., Chicago, the others going to the following concerns: London Auto Supply Co., Chicago, 1900; Mulholland & Co., Dunkirk, N. Y., 500; Hercules Buggy Co., Evansville, Ind., 400; the Okundy Co., Cleveland, 550; G. W. Straton Co., Defiance, Ohio, 1000; Eagle Wagon Works, Albany, N. Y., 1200; Continental Car Co., Louisville, Ky., 2000. The department declined to make public the prices on the above.

These truck bodies are to be built to the specifications which were described and illustrated in complete detail in THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES for June 21.

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### Large French Truck Order for White

NEW YORK, July 20—The White Motor Co. has closed an order for trucks with the French Government, the first installment of which, it is understood, will call for 1500 trucks, the full order taking 18 months to complete. The terms of the French contract are much more advantageous than those under which this Government last week ordered $30,000,000 of trucks. Additions to the Cleveland plant will be completed by early fall and will add 50 per cent to the production of trucks, increasing the output from 8500 to 12,500 trucks per annum. The new capacity will be devoted exclusively to foreign orders and United States government contracts, while the balance will go to domestic users.

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### $42,000,000 Orders for Nash

MILWAUKEE, WIS., July 23—Charles W. Nash, president and general manager of the Nash Motors Co., Kenosha, entertained between 125 and 150 distributers at a banquet at the Hotel Wisconsin in Milwaukee on Wednesday, as part of the annual convention of Jeffery and Nash sales organization members which was held at the plant in Kenosha all last week. It was stated that at the banquet contracts were signed for the purchase of passenger cars totalling $32,000,000 and trucks aggregating $10,000,000 in value, all for delivery during the coming year.

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### Aspell Handles Goodrich Government Work

NEW YORK, July 16—Thomas A. Aspell, for many years manager of the truck tire department of the New York branch of the B. F. Goodrich Co., Akron, Ohio, to-day took charge of the specification work covering material now being made by the Goodrich company for the United States Government. He will make his headquarters in Akron, although he will spend much of his time in Washington. He is succeeded in New York by J. E. Powers, who has been in charge of the truck tire department of the Buffalo, N. Y., branch of the Goodrich company for the past 8 years.

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### Willys-Overland Prices Revised

TOLEDO, July 25—Prices of Willys-Overland cars have been revised as follows: Light four touring, $750; roadster, $735; light six touring, $1,095; roadster, $1,080; Willys-Knight four, $1,450; 1208-lb. delivery car, $905 complete; minus body and rear fenders, $855; light delivery express type, $760 complete; panel type delivery car, $795 complete; or, minus body and rear fenders, $690.

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### BUICK TO BUILD 150,000

FLINT, MICH., July 24—The Buick Motor Co. has 150,000 cars scheduled for production during 1918. This is the largest production ever planned by the Buick Co., and is rendered possible by numerous factory additions just completed.

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### Automobile Makers Will Not Interfere with Action of Draft

DETROIT, MICH., July 24—Though definite action is not yet possible, automobile manufacturers as a whole seem to express the intention not to interfere with the action of the draft, but rather to let their drafted employees go, and to make the subsequent necessary adjustments. The Chalmers Motor Car Co. has issued a bulletin to each of the department heads, and to the foremen, stating that the men are to be allowed to go, and that every possible care be taken to make their departure as easy as possible. Hugh Chalmers, in addressing the Chalmers Round Table, said manufacturing necessity is to be of secondary consideration. This is in spite of the fact that Chalmers sales are ahead of the production at the present time.

In Cleveland, the White Motor Co. is engaged almost exclusively on war orders. The company's clerks have calculated that of the 3500 employees, from 700 to 800 are subject to draft, and that a large percentage of these may be called for the first city quota. Yet from that number, the concern will ask for exemption of only five men on occupational grounds. Prior to this, Windsor White had sent his best mechanics to the field artillery, when he learned that they were needed in this branch of the service.

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### Pierce-Blood on Airplane Engines

DETROIT, July 25—The Pierce-Blood Motor Co., marine engine manufacturer, has recently reorganized and plans to manufacture airplane engines. The company now occupies part of the factory owned by the Union Truck Co., but the latter company finds that the space is necessary for its increased output and planned expansion.

# Ford Will Not Raise Car Prices

## Expected Advance May Come in Fall—New Truck Chassis To Cost $600

DETROIT, July 25—Prices on Ford passenger cars will not be raised on Aug. 1. An increase on all the Ford models had been expected by Ford agents, but at a conference of the company officials yesterday the decision was reached not to make any advance at this time, although they are subject to advance at any time after that date.

The price of the Ford truck, however, which had been tentatively placed at $550, was made $600 for the chassis only.

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### To Make Shadwick Six

DETROIT, July 25—The Shadburne Bros. Co., which recently absorbed the Bour-Davis Motor Car Co. of Detroit, announces that it will place on the market a new car to be known as the Shadwick Six about the first of August. This company recently secured a new plant in Frankfort, Ind., and will continue to manufacture the Bour-Davis cars. The general sales offices will be at 2700 S. Michigan Avenue, Chicago.

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### Barnes Foundry Enters Trade

DETROIT, July 25—The Barnes Foundry & Mfg. Co. has been formed to engage in the foundry and machine business and will locate its plant in the River Rouge district It expects to have a modern fireproof plant in operation not later than December. It is incorporated with $1,000,000 7 per cent cumulative preferred and $1,000,000 common stock. The active organization will be:

President and general manager, Claire L. Barnes, former personal representative of John N. Willys and for years engaged in manufacturing, selling, buying, financing and executive activities; vice-president, George W. Smith, former production manager of the Maxwell Motor Co. and at present manufacturing manager in the J. I. Case plant in Racine; secretary-treasurer, Charles E. Pelton, at present assistant manager of the Motor Products Corp.; foundry superintendent, C. E. McArthur, general foundry superintendent in the J. I. Case plant in Racine.

The directors will be: Barnes, Smith, Pelton and D. B. Lee, general manager, Motor Products Corp.; George E. Edmunds, vice-president, Edmunds & Jones Mfg. Co.; William E. Metzger, director, National Automobile Chamber of Commerce; Frank G. Smith, Jr., capitalist; Archer A. Landon, vice-president, American Radiator Co.; Edward A. Loveley, vice-president, Stormfeltz Loveley Co.

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### Westcott Expands Sales Force

SPRINGFIELD, OHIO, July 24—The sales department of the Westcott Motor Car Co. has been enlarged and will be under the personal direction of General Manager H. G. Root assisted by E. H. Gilcrest and P. W. Runyan. Mr. Runyan will be in charge of sales promotion and advertising. The United States has been divided into divisions of such size as to insure close factory co-operation. A resident manager is located centrally in each division, enabling him to be in constant touch with all Westcott distributors and dealers in his territory.

There will be five main districts, each under a special district sales manager, as follows: Eastern, Morrow W. Applegate; Central, E. H. Gilcrest; Middle Western, Harry H. Brehm; Western, J. L. Zismer, and Southern, E. Lee Harrison.

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### 2-MILE WORLD'S RECORD FOR PACKARD

NEW YORK, July 25—A new 2-mile world's record was made to-day by a Packard using an aviation twelve-cylinder engine of 905 cu. in. displacement. After several trials against a stiff wind the car, driven by Wm. Rader, negotiated 2 miles in 58.2 sec., or at 123.88 m.p.h., thus lowering the previous record of 58.99 held by Hornsted in a Benz at Brooklands June 24, 1914. The previous American record was 1:10 made by Oldfield at Tacoma in a Christie July 5, 1915.

A new unofficial record of 4:55 4-5 was hung up by Rader for 10 miles, beating the former world's record of 5:19.78 made by Hornsted at Brooklands Jan. 14, 1914, in a Benz. The American record has been held by Aitken in a Peugeot since Sept. 30, 1916, when he drove the distance in 5:45. Rader was timed by stop watches.

Several changes have been made in the original Packard aviation engine described in THE AUTOMOBILE AND AUTOMOTIVE INDUSTRIES. The present job has steel cylinders set at a 40 deg. angle. The engine is 4 by 6 and is rated at 265 hp. on the block. The car is geared on high at 1¾ to 1. Other features include 2¼ in. Rich tungsten steel valves, a safety blowout plug for water, eighteen steel plate clutch, a double drive axle of the Mercedes type.

The engine weighs 800 lb., thus giving it 3 lb. to the horsepower. A Fedders radiator using 7 gal. of water is also used. Other features include Hartford shock absorbers, Rudge-Whitworth wire wheels, A. C. spark plugs, Bosch magneto, Bijur starting system, and double Zenith carbureter.

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### Bijur Gets Broad Electrical Equipment Patent

NEW YORK, July 25—A patent was issued on July 17 to the Bijur Motor Lighting Co. of Hoboken, N. J., on a two-unit electric lighting and starting system for motor vehicles, which was applied for March 13, 1912, and which contains forty-two claims. It bears the number 1,233,961. The patent covers various features of the two-unit system as now generally used on automobiles and may possibly become a strong factor in the electrical equipment field.

# Tractor Meeting To Break Record

## S. A. E. Session Will Be Greatest Gathering of Tractor Engineers Ever Held

NEW YORK, July 20—Unquestionably the greatest gathering of farm tractor engineers will take place at Fremont, Neb., during the week of the national tractor demonstrations Aug. 6-10 inclusive. The work of the Society of Automotive Engineers, so far as the program for the week is concerned, will be confined to Wednesday and Thursday, Aug. 8 and 9. On Wednesday, Aug. 8, on the occasion of the tractor dinner, Arnold P. Yerkes will address the tractor engineers and manufacturers on The Tractor from a Farm Management Viewpoint. Mr. Yerkes, speaking for the Department of Agriculture, has studied the tractor entirely from the economic standpoint. It is expected he will point out how desirable it is from the farmer's viewpoint to have several standards adopted, in fact, the more the better.

### Lively Discussion Promised

Already many engineers have consented to take part in the discussion on the question of kerosene vs. gasoline as a tractor fuel, which discussion will take place on Wednesday evening, Aug. 8.

The problem of tractor service has developed so speedily that Thursday evening, Aug. 9, will be known as tractor service evening, and that subject will be up for consideration. Dent Parrott, of the Parrott Tractor Co., Chicago, will open the subject with a paper on tractor service, after which there will be a discussion handled by eight or ten other tractor engineers. Tractor service has been a bothersome problem and requests were general for an entire evening for its consideration.

W. G. Clark, mechanical engineer, Wilcox-Bennett Carbureter Co., Minneapolis, Minn., will read the paper on Kerosene vs. Gasoline as a Tractor Fuel, which A. C. Bennett, president of the company, was originally scheduled to read.

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### MARVEL CO. TO MAKE BRITTON CARBURETER

FLINT, MICH., July 21—A new carbureter invented by T. B. Britton of Cleveland, and known as the Britton carbureter, is to be manufactured by the Marvel Carburetor Co., this city. A complete line of sizes is being brought out, particular attention being paid to the sizes necessary for large engines, such as used in aviation work.

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### Studebaker Orders 60,000 Sparton Systems

DETROIT, July 25—An order for 60,000 Sparton vacuum fuel systems has been placed by the Studebaker Corp. with the Sparks-Withington Co.

# French Aviators Examined

## Must Be Complete Masters of Machine and Air—Training Is Thorough

SOMEWHERE IN FRANCE, June 10—From reports reaching America with regard to the new aviation program it is certain there will have to be corrected many false impressions with regard to training of aviators and pilots. In France no aviator receives his license until he has proved himself complete master of the machine and the air, and in America there is a harder course ahead of the aviator than is generally contemplated. The person who thinks that ability to fly 30 miles across country will gain him a pilot's license is in error.

### Two Preliminary Trips

Here in France aviators have to make two short cross-country trips called "petite voyage," which are, however, only preliminary to the triangular trips in which you have to stop at different angles of the triangles and have your papers signed showing that you have made the complete circuit. Each of these triangular trips is approximately 40 miles and the trip must be made in 1 hr.

Following this triangular test there are similar tests over larger triangles in which you fly from town to town, alighting at each town to have your paper signed. Such a triangular trip has to be made twice over different courses and your machine is fitted with a barograph which not only checks your course but also the height at which the trip was made. Each of these trips is approximately 200 miles and the minimum altitude permitted is slightly over 3000 ft.

### Altitude Test

The next step is an altitude test in which the pupil must fly at a minimum of 6000 ft. and remain there for 1 hr.

Having done this practical flying the pupil is breveted a pilot, and if his record is good with a minimum of breakages he may be given the standing of a corporal.

### Many Improvements

Much improvement is being made in airplanes, and the new models coming out are generally good improvements on the existing types. One new scout machine with 130 hp. engine has 15 square meters of surface, and is capable of climbing to a 10,000 ft. altitude in 9 min. flat. Other machines have had this climbing ability, but not with such small engines as are used in the latest types of airplanes.

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### Sunderman Raises Prices

NEWBURGH, N. Y., July 24—The Sunderman Corp. announces price changes on the Sunderman vacuum carbureter, effective Sept. 1, 1917. The 1-in. carbureter, heretofore selling at $5 list, for Ford and Metz cars, will then list at $6. The same instrument, with elbows for cars other than Ford and Metz, will be $8. On cars requiring special fittings an extra charge is made according to the fitting required.

This company has recently equipped its own foundry, made necessary by the large increase in sales this year and the consequent difficulty of securing an adequate supply of castings.

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### 1918 McLaughlin Ready Sept. 1

OSHAWA, ONT., CAN., July 23—The McLaughlin Carriage Co. announces a new 1918 model that will appear about Sept. 1. An increase in price is expected.

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### Glass Prices May Advance 100 Per Cent

NEW YORK, July 24—Window glass prices are expected to rise, according to predictions at the seventh annual meeting of the National Assn. of Window Glass Manufacturers held at the Hotel Astor. On account of war conditions and the increased cost of raw materials, it is expected that prices for the new season about to open will be between 25 and 100 per cent higher than last year.

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### ALUMINUM FROM KAOLIN

NEW YORK, July 23—Owing to the enormous increase in the demand for aluminum for use in airplanes and automobiles, it may be found necessary to produce this metal from kaolin or fire clay in the future, instead of from bauxite, its present source. This prediction is made by Dr. F. C. Weber, a Chicago industrial chemist. Germany has been obtaining aluminum from kaolin since its supply of French bauxite was cut off. According to Dr. Weber, this country's supply of kaolin is practically inexhaustible. The largest deposits are in Illinois. Weber has submitted his theory to the Society of Industrial Engineers, which, in turn, will take it up with the Council of National Defense.

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# Castle Handles C-H Gearshift for U. S.

DETROIT, July 23—The F. E. Castle Co. has secured the sales agency for the entire United States for the Cutler-Hammer magnetic gearshift, manufactured by the Cutler-Hammer Mfg. Co., Milwaukee, thus taking over the entire charge of the marketing of that product. The C-H shift was originally the Vulcan. It is now standard equipment on the Premier and optional on a number of other makes. F. E. Castle, who heads the sales company, has specialized in merchandising for some time during which he has successfully carried on the sales of E. & J. lamps, Hayes wire wheels and other accessories.

# Iron Output Shows Shortage

## First Half of 1917 Reveals Lowering of Blast-Furnace Capacity—Big Demand

WASHINGTON, July 23—Abnormal conditions prevailed in the iron industry during the first half of 1917, mainly on account of the war in Europe. At the beginning of the year, when pig iron was being made at the average rate of about 102,000 gross tons daily, the blast furnaces were operated at slightly reduced capacity, according to E. F. Burchard, of the United States Geological Survey, Department of the Interior. This rate dropped to less than 95,000 tons daily in February, but in March the rate rose to 105,000 tons daily, and in April and May it stood at more than 110,000 tons, compared with the maximum rate of 113,000 tons in October, 1916.

### Total Output 15,800,000 Tons

The prospective blast-furnace capacity seems not to have kept pace with the demand, however, as is indicated by the enormous increases in price, especially since the United States entered the war.

The total output of coke and anthracite pig iron in the first 5 months of 1917 was about 15,800,000 gross tons, compared with about 16,175,000 tons during the corresponding period of 1916, a decrease of about 2 per cent.

The quantity of iron ore from mines in the Lake Superior region shipped from upper Lake ports from Jan. 1 to June 1, 1917, was about 6,500,000 gross tons, compared with slightly more than 10,100,000 tons for the corresponding five months of 1916, a decrease of about 3,600,000 tons, or more than 35 per cent. This apparently large decrease in ore shipments from the principal producing region was not due to inability to mine ore but largely to the belated opening of Lake traffic because of ice blockades and to many ore-carrying boats having been put out of commission through accidents.

Plans are being made by committees of the Council of National Defense to increase shipments of iron ore, coal, and coke during the remainder of the season through co-operative methods, and possibly the June shipments will nearly equal those of June, 1916. In the meantime the blast furnaces have been drawing on large stocks of ore at lower Lake ports in order to offset the deficiency in upper Lake shipments. Deferred shipments of coke and other causes of traffic congestion have also retarded operations at some furnaces.

### Pig Iron Prices Higher

Prices of pig iron at western Pennsylvania furnaces have advanced since January 1, 1917, 61 to 77 per cent and since a year ago 164 to 200 per cent. On July 3, 1917, basic iron was quoted

at Valley furnaces at $52 a ton, Bessemer iron at Pittsburgh at $57.95, and No. 2 foundry iron at $55, while at Birmingham, Ala., foundry iron, which one year ago sold at $14 brought $47 a ton. Low phosphorus iron has been quoted at $70 to $80 a ton. Feverish buying of pig iron by private consumers who were endeavoring to provide for their present needs, as well as for their needs far into 1918, has caused much of the recent increase in price. The extent of the Government's war needs for steel is not yet defined, but increasing. Orders are being placed slowly, however, and they should not interfere seriously with deliveries of steel to private consumers. As the Government is not competing in price it would seem that there may be at least some warrant for belief that prices may adjust themselves without need for further great inflation.

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### Iron Prices Soar

DETROIT, July 23—In spite of the increased demand for iron the total output for the first 5 months of 1917 was less than for a similar period in 1916. This was not caused by inability to mine for ore but from the difficulty in ore shipments. Shipments from the Lake Superior region were hindered by ice blockades and by accidents to the ore carrying boats. The following are figures on the iron situation according to E. F. Burchard, of the United States Geological Survey, Department of the Interior:

Output of coke and anthracite pig iron—First 5 months of 1916, 16,175,000 gross tons; first 5 months of 1917, 15,800,000 gross tons; — 1.8 per cent loss.

Iron ore from Superior region—First 5 months of 1916, 10,000,000 gross tons; first 5 months of 1917, 6,500,000 gross tons; — 35 per cent loss.

Price increase, + 164 per cent to 200 per cent gain.

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### Coal Moving Rapidly—Car Shortage Smaller

WASHINGTON, July 16 — Manufacturers can be sure of getting coal. The transportation committee of the Council of National Defense reports that coal-car shortage is being reduced daily. On May 1 there was a shortage of 148,627 cars; on July 1 it had been reduced to 105,000, though business was steadily increasing.

### War Won't Block Traffic

The war will not block traffic. During April, 1917, 29 per cent more bituminous coal was handled than in the same month of 1916. Efficiency methods have been worked out to increase the available number of cars. Heavier loading, quicker repairs and quicker movements are expected to greatly increase the number of cars available for freight work at any one time.

Increased production is another factor which will ease up the coal situation. On one road over 100 new mines have been opened in the last 6 months.

# Controller for Steel Output

## Parker of U. S. Steel to Fill Same Position as Hoover—Other Experts to Advise

WASHINGTON, July 23—J. A. Parker, of Pittsburgh, export manager of the United States Steel Products Co., appointed to an advisory position with the new exports council, will be expected to do the same thing for steel and iron that Herbert C. Hoover is now doing for food.

The selection of Mr. Parker for this important task is regarded here as suggesting the appointment of other experts to advise the government on the exportation of other items or groups of items of export the same as Mr. Parker is advising as to iron and steel, and Mr. Hoover as to food and foodstuffs.

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## Economy in Gasoline Urged

(*Continued from page* 162)

dustry. In reliance therefore on the good faith of the Government and while this issue is in abeyance, there should be no relaxation on the part of producers in their efforts to turn out oil, and every private individual and industry should consider it a patriotic duty to observe all possible economy in the consumption of gasoline.

"The Advisory Committee of the Council of National Defense appointed a subcommittee on petroleum, and it is the purpose of this committee to assist the Government in every possible way in the successful prosecution of the war. That can only be accomplished by co-operation not alone of producers of petroleum but of all users of petroleum products."

Van H. Manning, director of the Bureau of Mines, commenting upon the statement of President Bedford, of the Standard Oil Co., to the effect that economies in the use of gasoline amounting to doing away with pleasure riding and the use of cars for purposes of necessity only, because of the situation as to the petroleum output, said he had for some time believed this situation to be true, and that he had suggested it to Mr. Bedford some time ago. He added:

"A consideration of the present status of the petroleum industry in the United States and its intimate relation to the progress of the war brings forcibly to the mind of a close observer, first, that our Allies must have petroleum in increasingly large quantities; second, that the United States must furnish the bulk of it, and third, that the country facing a shortage in petroleum and some of its products."

By considering the number of wells drilled, the initial production of the wells, and the past monthly production, the following estimates have been made of the production for 1917:

Appalachian Field—There is very little possibility of an increase in the production of this field, unless more transportation facilities are provided for the new Kentucky fields, in which case the production of the Appalachian district may be increased by 1,000,000 barrels.

Lima, Ind., Oil Field—The production of this field declined 8½ per cent during 1916, and an increase in the 1917 production is unlikely. The field during 1916 produced about 4,000,000 barrels.

Illinois Field—There is very little possibility of increasing the 1917 production in Illinois, and it will probably be reduced 1,000,000 barrels this year.

Mid Continent (Kansas-Oklahoma) Oil Field—Present information indicates that the production in 1917 for Kansas and Oklahoma will be approximately less than it was in 1916.

North Texas Fields—The pools in this district will hold their own and may exceed the 1916 production by 2,000,000 barrels.

Caddo Field (La.)—Production here will probably be reduced 2,000,000 barrels.

Gulf Coast Field—Production will probably be about the same in 1917 as it was in 1916.

Rocky Mountain Fields—Wyoming is the only Rocky Mountain state with a greater potential supply of petroleum than is now being utilized and this supply is tied up by the present inadequate transportation facilities and the status of the public lands. Under present conditions the production in 1917 will probably be about the same as in 1916.

California Field—Present production figures, high prices, and the fact that California has produced 31,600,000 barrels of crude during the first 4 months of the year, indicate an increase of about 2,000,000 barrels over the production of 1916, which will not, of course, offset the 12,000,000 barrels that will be taken from storage.

Mr. Manning said that it must be remembered the bringing in of a good pool in any district would naturally make a change in the estimates for that particular district. He also called attention to the heavy draft which will have to be made upon stocks this year, amounting probably to 67,000,000 barrels, whereas in 1916 only 18,500,000 barrels were withdrawn, and in 1915 none. Mr. Manning said that his records indicate a reduced yield for 1917 as compared with 1916 of 9,300,000 barrels.

George E. Peabody, of the Coal Production Committee of the Council of National Defense, expressed a like view. Mr. Peabody said that if the United States should go on in the same way, developing no more coal and oil than at present, the country would be out of reserve oil in 12 months. It would be producing per year approximately 50,000,000 barrels less than is needed, leaving out the Mexican supply and assuming that everything remained normal.

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### New York Seeks New Lens

SYRACUSE, N. Y., June 19—The New York State Motor Federation will call a meeting in this city this week to determine an automobile lens which conforms exactly to the requirements of the Hewitt bill, which goes into effect Aug. 1.

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### NEW CASING-HEAD GASOLINE PLANTS

NEW YORK, July 23—At Mansfield, Ohio, a plant for the extraction of gasoline from natural gas has just been completed for the City's Service Co., and is said to be working satisfactorily, the yield being from 600 to 1000 gal. per day. The company has 20,000 gal. of this gas in storage, which has just been sold. Another gasoline extraction plant is being installed by the company at Union, Ohio. The gas to be handled at this plant is taken from the Licking County field and is expected to yield at

least 10 per cent more gasoline than that of the Medina fields supplying the Mansfield plant; in fact, as much as a pint and a half per 1000 cu. ft. of gas treated is expected. Still another plant, designed for handling 2,000,000 ft. of gas per day, is under construction at Utica.

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### NEW COMPANIES

DEFIANCE, OHIO, July 24—The Defiance machine works, manufacturer of wood-working machinery, has increased its capitalization from $600,000 to $1,200,000, for expanding into the automotive field. Large purchases of real estate have been made, and several new concrete and brick buildings will be erected.

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CHARLEVOIX, MICH., July 24—The Young High Velocity Carbureter Co. has engaged in business to manufacture automobile supplies. Authorized capital is $250,000, all subscribed and $25,000 paid in cash.

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WILMINGTON, DEL., July 25—The Pathfinder Motor Co. of America has been incorporated in Delaware to manufacture automobiles, trucks and engines. There is $2,000,000 preferred and common stock of no par value. The Pathfinder company was recapitalized 4 months ago for $5,000,000.

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RACINE, WIS., July 21—The Maibohm Wagon Co., which has been building cars for more than a year, has reincorporated under the laws of Maine, with a capital stock of $500,000.

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BURLINGTON, WIS., July 23—Stockholders and officers of the Burlington Blanket Co., Burlington, Wis., one of the oldest manufacturers of robes, blankets, dusters and other specialties in the Middle West, have organized the Burlington Truck Co. to manufacture and market a truck and trailer unit for application to Ford chassis. A machine-shop has been opened in the Eggers building in Burlington, and the new concern has started actual manufacturing of truck units.

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SPRINGFIELD, MASS., July 23—The Steam Motors Co., capitalized at $25,000, has been incorporated by E. F. Gebhardt, Jr., president; Irving B. Hitchings, Lynn, treasurer, and W. J. A. London.

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DETROIT, July 23—The Consolidated Motors Co. has been formed in this city with a capital of $50,000.

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JACKSON, MICH., July 23—The General Machine & Tool Co. of Jackson has been formed with a capital of $24,000.

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CLEVELAND, July 23—The Cleveland A-B-C Starter Co. has been incorporated with $10,000 capital to manufacture starters. Ray W. Cudmore, H. L. Edwards, C. Edwards are the incorporators.

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DOVER, DEL., July 23—The Pittsburgh Rubber Tire & Mfg. Co. has been formed with a capital stock of $1,000,000.

# Ordnance Truck Body Bids

## To Call for 1000 Ammunition, 700 Supply and 500 Repair Types

WASHINGTON, July 25—The Ordnance branch of the army is preparing to buy considerable quantities of ammunition bodies for 3-ton and 5-ton trucks, and also supply and repair trucks. Specifications for these are now completed and Major Moody, in charge of the work, expects soon to ask for bids.

The first bids will call for about 1000 ammunition bodies, probably 700 supply trucks and 500 repair types. Exceptionally substantial construction will be required of the supply and repair trucks, as they will be called on in service to carry a load of from 4000 to 5000 lb.

### Working On a Tank

Specifications also are being drawn for tractors, creepers, etc., and these will soon be ready. The Ordnance branch is working on a tank which promises exceptional performance but, for different reasons, specifications for this machine will not be made public.

The tractors are to be standardized as far as possible, the Holt design being used, but it is planned to call upon others than the Holt company for bids.

Standard specifications for these motor truck ammunition bodies as approved by the Chief of Ordnance follow:

GENERAL CONDITIONS

1. QUALITY OF MATERIALS: Except it be otherwise specified, all materials are to be the best of their respective kinds, and all labor is to be done in the most thorough and workmanlike manner. In all cases where an article is mentioned in these specifications in connection with the words "best quality," "best make," "proper," or "suitable," the Ordnance Department or its authorized representative shall decide what is best and most suitable to use.

2. AWARD OF CONTRACT: The bodies herein specified are to be used in the field service of the Ordnance Department, and in the selection of bodies and award of contract, the quality of material, design, workmanship, and suitability for use in field service will be given due weight in determining which proposal shall be accepted.

3. EMPLOYMENT OF CONVICT LABOR: In the performance of work herein specified, the contractor shall not directly or indirectly employ any person undergoing sentence of imprisonment at hard labor which may have been imposed by a Court of any State, Territory or Municipality having jurisdiction, nor permit such employment by any person furnishing labor or material to said contractor in fulfillment of this agreement.

4. PATENTS: The contractor shall for all time secure to the Government the free and undisputed right to use any and all patented articles used in the work, and shall defend at his own expense any and all suits for infringement of any patent or patents, and in case of adverse claims under patents, the contractor shall pay all awards.

DESCRIPTION

5. GENERAL REQUIREMENTS: These specifications contemplate the furnishing, f.o.b. factory, of the number of bodies stated in the "Instructions to Bidders." The bodies shall be complete in every respect, and ready for installation on the chassis frame. It is intended that these bodies shall be so constructed as to permit of their installation on any chassis frame irrespective of the width or height of frame, and at the same time permit of ready access to the transmission and rear axle, and to give a proper clearance between the rear wheels and truck body when the truck is fully loaded. The body shall be constructed in accordance with details shown on drawings, Nos. 00.

6. MATERIAL: The entire body, sides, end and rear doors are to be made of No. 10 Flange Steel Commercial or best quality No. 10 hot rolled, smooth finish, medium temper steel of 0.5 to 0.15 carbon; 0.10 desired.

7. All iron or steel used in construction of bodies must be free from rust, corrosion or pitting, and must not be bent or warped. Where malleable castings are used they must be thoroughly annealed. The special body parts shown on the drawings, including fastening brackets of body to chassis, hinges and hinge butts must be made of forged steel.

8. The body shall be reinforced at proper intervals as shown in sketch "No. B," July 14, 1917, with 3"-4-lb. standard steel channels thoroughly fastened to the body with hot 7/16" rivets. All holes in the body shall be 1/32" larger in diameter than rivets, and will be punched and reamed.

9. All parts of the body must be connected by 7/16" hot rivets. Fastening brackets of body to chassis will be riveted to body with hot 7/16" rivets.

10. All steel floor plates, loading plate, body side and end top angles or channel, and all other steel strips or sections shall be in continuous lengths. No piecing of these parts will be permitted.

11. Brackets for securing various implements to body will be installed in such locations as shown by drawing and will conform to drawing Nos. 00.

COVERS

12. MATERIAL: The body covers must be of best quality No. 6 standard cotton duck, made from American cotton, woven in a workmanship manner and free from imperfections, thoroughly brushed to remove motes or other foreign substances, and must be waterproofed. No pieced lengths will be allowed.

13. The covers must have grommets worked over ¾" galvanized rings. Ropes to be ¾" of best quality Manila. All side ropes to be neatly spliced into grommets, all face ends to be well whipped with well waxed thread.

14. LETTERING: All covers must be stencilled in two places with "U. S." with 6" black Doric letters, and "ORD." and "DEPT." with 4" black Doric letters, the

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### CROSS-LICENSE AGREEMENT ON AIRPLANE PATENTS

NEW YORK, July 26—Through the National Advisory Committee for Aeronautics a cross-licensing agreement has been reached between manufacturers of airplanes holding important patents.

The one thing that was in the way of a rapid expansion of the airplane industry, in that it discouraged the investment of large capital, was the existence of a number of patents claimed to be fundamental. It was foreseen, of course, that the Government could not allow this hindrance to the development of the airplane industry to continue, so the National Advisory Council for Aeronautics stepped in and got the different airplane manufacturers together.

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### Three New M. & M. Members

NEW YORK, July 25—The Anderson Forge & Machine Co., Detroit, the Taft-Peirce Mfg. Co., Woonsocket, R. I., and the S. K. F. Ball Bearing Co., Hartford, Conn., were elected members of the Motor & Accessory Manufacturers, at today's meeting of the board of directors.

A. P. Sloan, Jr., has resigned as a member of the executive committee and is succeeded by L. M. Wainwright, president of the Diamond Chain & Mfg. Co., Indianapolis.

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### Pullman Plant Sold for $392,000

YORK, PA., July 25—The Pullman Motor Car Co. plant has been sold for $392,000 to the same interests which recently bought the Enger assets.

whole to be arranged symmetrically, as shown in drawing.

15. GENERAL PROVISIONS: The covers must be made in accordance with the dimensions shown on drawings. All work to be done in the best workmanlike manner. Covers to be subject to the usual inspection.

16. PAINTING: The bodies must be painted all over, as per drawing 27-26-1 (prints of which specification will be sent on request), each coat of paint being permitted to thoroughly dry before applying the succeeding coat.

17. All iron and steel must be given one good coat of lead and oil, and permitted to thoroughly dry before assembling.

### MOTOR PRODUCTS SALES INCREASE 62 PER CENT

DETROIT, July 24—Sales of the Motor Products Corp. in the 6 months ended June 30 totaled $5,033,617, compared with $3,096,924 in the first 6 months of 1916, an increase of $1,936,692, or 62.6 per cent. In the first 4 months of 1917 the company increased its sales $1,423,933, or 74 per cent, the actual figures this year being $3,368,230, against $1,944,297 a year ago. In May and June, months in which the automobile industry was feeling the shock of the United States' entry into the war, this company's sales increased 71 per cent and 20 per cent, respectively, over a year ago.

The Motor Products Co. is understood to have ample supplies of raw materials on hand, and to have orders on its books which will insure a volume of business of at least $9,000,000 for the current year.

### 50 Per Cent Earnings for Packard

DETROIT, MICH., July 24—The Packard Motor Co.'s coming statement is expected to show earnings for the first half of this year of approximately 50 per cent.

# Security Prices Slump

## Airplane Stocks Feature Automotive Activities with 3 3-4 Point Gain

NEW YORK, July 25—A fresh period of weakness occurred in automobile issues yesterday on account of the statement of A. C. Bedford pointing to the necessity of fuel conservation. On the other hand, airplane, motorcycle and motorboat issues held strong. The Government's $640,000,000 air budget already has been reflected in movements of the airplane stocks. Wright-Martin and Curtiss figured prominently with their strength, the former going up 3¾ points.

The expected passing of dividends by several of the automobile companies played an important part in the further decline of several of the automobile stocks. Saxon has passed its dividend and the 10-point decline in Maxwell common, it is stated, is based on an expectation that the directors at the July meeting might omit the dividend. The common is now on a 10 per cent basis.

### STUTZ EARNS $8.29 A SHARE

NEW YORK, July 20—The Stutz Motor Car Co. of Indiana, the entire capital stock of which is owned by the Stutz Motor Co. of America, reports a net profit for the 6 months ended June 30 of $621,775, which is equivalent to $8.29 per share on the stock of the parent Stutz company. This earning power of $8.29 a share for the 6 months period compares with the present annual dividend rate of $5 a share. Six months surplus this year of $621,775 compares with a surplus of $649,000 in the entire calendar year 1916.

The income account for the 6 months ended June 30 follows:

| | |
|---|---|
| Net sales | **$2,489,622 |
| Cost of sales | 1,843,456 |
| Gross profits | $646,165 |
| Selling, administration and general expenses | 50,317 |
| | $595,848 |
| Interest and discount | 50,317 |
| Net profit for 6 months | *$621,775 |

*Equal to $8.29 per share on 75,000 shares of Stutz Motor stock outstanding. **Compared with $1,771,328 for 7 months ended Dec. 31, 1916.

### Chandler Earns $1,574,000 in 6 Months

NEW YORK, July 20—The Chandler Motor Co. reports net earnings for 6 months ended June 30 as $1,574,000, comparing with $863,000 for the same period of 1916. It is estimated that profits to Aug. 1 will equal $26 a share on $7,000,000 capital.

### Portage Rubber Offering Stock

BARBERTON, OHIO, July 23—The Portage Rubber Co. announces a new stock offering of $500,000 to be voted Aug. 23. There is now outstanding $2,000,000 common stock, which is virtually the whole outstanding capitalization. There is in the treasury $1,000,000 of the old preferred, which it is proposed to cancel. Instead the company plans to issue $500,000 new 7 per cent cumulative, nonparticipating preferred, and $500,000 new common.

Each stockholder of record Sept. 1

## Automotive Securities Quotations on the New York and Detroit Exchanges

| | Bid | Asked | Net Ch'ge |
|---|---|---|---|
| *Ajax Rubber Co | 67 | 68 | .. |
| *J. I. Case T. M. Co. pfd | .. | 84 | .. |
| Chalmers Motor Co. com | 9 | 12 | .. |
| Chalmers Motor Co. pfd | .. | .. | .. |
| *Chandler Motor Car Co | 80 | 81 | —6¾ |
| Chevrolet Motor Co | 94 | 96 | +2 |
| Curtiss Aeroplane com | 43 | 44 | .. |
| Fisher Body Corp. com | 36¼ | 37 | — ¼ |
| Fisher Body Corp. pfd | 85 | 88 | .. |
| Fisk Rubber Co. com | 74 | 76 | .. |
| Fisk Rubber Co. 1st pfd | 103 | 106 | .. |
| Fisk Rubber Co. 2nd pfd | 92 | 95 | .. |
| Firestone Tire & Rubber Co. com | 120 | 125 | .. |
| Firestone Tire & Rubber Co. pfd | 103 | 106 | .. |
| *General Motors Co. com | 114¾ | 115 | .. |
| *General Motors Co. pfd | 84½ | 88 | —2 |
| *B. F. Goodrich Co. com | 54⅜ | 54½ | +4⅞ |
| *B. F. Goodrich Co. pfd | 104 | 106½ | — ⅛ |
| Goodyear Tire & Rubber Co. com | 197 | 201 | —1 |
| Goodyear Tire & Rubber Co. pfd | 105 | 107 | .. |
| Grant Motor Car Corp | 3 | 6 | .. |
| Hendee Mfg. Co | 25 | 32 | .. |
| Hupp Motor Car Corp. com | 2½ | 3½ | — ¼ |
| Hupp Motor Car Corp. pfd | 72 | 80 | .. |
| International Motor Co. com | 5 | 10 | .. |
| International Motor Co. 1st pfd | 30 | 50 | .. |
| International Motor Co. 2nd pfd | 10 | 20 | .. |
| *Kelly-Springfield Tire Co. com | 46¾ | 49¾ | — ¼ |
| *Kelly-Springfield Tire Co. 1st pfd | 88 | 95 | .. |
| *Lee Rubber & Tire Corp | 20¾ | 21 | — ⅞ |
| *Maxwell Motor Co., Inc. com | 34¼ | 34½ | —10 |
| *Maxwell Motor Co., Inc. 1st pfd | 63 | 66 | +2¾ |
| *Maxwell Motor Co., Inc. 2nd pfd | 26 | 27¼ | —2 |
| Miller Rubber Co. com | 175 | 185 | .. |
| Miller Rubber Co. pfd | 102 | 104 | .. |
| Packard Motor Car Co., com | 125 | 135 | .. |
| Packard Motor Car Co., pfd | 94 | 96 | —1 |
| Paige-Detroit Motor Car Co | 25 | 27 | —1 |
| Peerless Truck & Motor Corp | 14 | 16 | .. |
| Portage Rubber Co. com | 150 | 154 | .. |
| Portage Rubber Co. pfd | .. | .. | .. |
| Regal Motor Car Co. pfd | .. | 22 | .. |
| Reo Motor Car Co | 25 | 26 | .. |
| *Saxon Motor Car Corp | 16¾ | 17 | —1¼ |
| Springfield Body Corp., com | 5 | 15 | .. |
| Springfield Body Corp., pfd | 20 | 50 | .. |
| Standard Motor Construction Co | 11 | 12 | .. |
| *Stewart-Warner Speed. Corp | 63 | 4½ | —2 |
| *Studebaker Corp., com | 54⅜ | 54½ | —3⅜ |
| *Studebaker Corp., pfd | 91¼ | 96 | —1¾ |
| Swinehart Tire & Rubber Co | 59 | 65 | .. |
| United Motors Corp | 24⅛ | 24½ | —2 |
| *U. S. Rubber Co., com | 60½ | 61¼ | —2 |
| *U. S. Rubber Co., pfd | 106 | 109 | —1½ |
| *White Motor Co | 46 | 47 | — ½ |
| *Willys-Overland Co., com | 30½ | 31 | —1½ |
| *Willys-Overland Co., pfd | 96 | 96½ | +1 |
| Wright-Martin com | 12¾ | 12⅞ | +3¼ |
| Wright-Martin pfd | 50 | 60 | .. |

*At close July 23, 1917. Listed New York Stock Exchange.

### OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

| | Bid | Asked | Net Ch'ge |
|---|---|---|---|
| Auto Body Co | .. | 29 | .. |
| Bower Roller Bearing Co | .. | 38 | .. |
| Chevrolet Motor Co | 90 | 94 | +90 |
| Commerce Motor Car Co | .. | 10¾ | .. |
| Continental Motor Co. com | 6⅜ | 6¾ | — ⅛ |
| Continental Motor Co. pfd | .. | 92½ | .. |
| Edmunds & Jones com | .. | .. | .. |
| Ford Motor Co. of Canada | 220 | .. | .. |
| Hall Lamp Co | .. | 25½ | .. |
| Hayes Mfg. Co | .. | .. | .. |
| Michigan Stamping Co. com | .. | 14¾ | .. |
| Motor Products | .. | .. | .. |
| Packard Motor Car Co. com | .. | 132 | .. |
| Packard Motor Car Co. pfd | .. | .. | .. |
| Paige-Detroit Motor Car Co | .. | 27⅞ | .. |
| Prudden Wheel Co | 21 | .. | +21 |
| Reo Motor Car Co | 26 | 26½ | — ⅛ |

INACTIVE STOCKS

| | | | |
|---|---|---|---|
| Atlas Drop Forge | 38 | 41 | .. |
| Kelsey Wheel Co | 82 | .. | .. |
| Regal Motor Car Co | .. | 26½ | .. |

is to be offered new stock at par to the extent of 50 per cent of his holdings; of the 50 per cent, half will be common and half preferred, and the holder, in order to exercise rights, must take an equal amount of each.

Payments can be made in four equal installments on the first of each month beginning Oct. 1, installments to receive 6 per cent interest until one or more shares are paid up. The new preferred is to be redeemable at 112 after Jan. 1, 1920. Net quick assets amounting to 125 per cent and total assets amounting to 200 per cent of outstanding preferred are to be maintained at all times.

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**Willys-Overland Completes Financing**

NEW YORK, July 23—The Willys-Overland Co. now completely dominates the Curtiss Aeroplane Co. and has completed all its financing. Work begins to-morrow on two buildings of 1000 ft. in length each, and both guaranteed ready for occupancy in 45 days from to-day. The company is booked solid for airplane engines until July 1, 1918.

TOLEDO, July 23—It is estimated that the July sales of the Willys-Overland Co. will total more than $16,000,000. For the first week in July reports received at the local headquarters show $3,150,000 in retail sales, a daily average of more than $625,000. On July 5 the day's business amounted to $1,048,020, a new mark for daily sales. There was $903,720 worth of business done on July 2. These records were for the United States alone.

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**DIVIDENDS DECLARED**

Stewart-Warner Speedometer Corp., 1½ per cent, payable Aug. 15 to stock of July 30.

Mitchell Motors Co., quarterly of $1.50 per share, payable Aug. 24 to stock of record of Aug. 10.

Hood Rubber Co., quarterly of 1¾ per cent on preferred, payable Aug. 1 to stock of record July 26.

Nash Motors Co., $1.75 per share on outstanding preferred, payable Aug. 1 to holders of preferred of record July 20.

—

**Saxon Passes Dividend**

NEW YORK, July 25—Directors of the Saxon Motor Car Corp. passed the quarterly dividend at their annual meeting yesterday in Detroit. It is stated that the company will continue as a non-dividend payer until its cash resources have been strengthened to meet the varying conditions in the automobile industry. The last disbursement was $1.75 a share.

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DETROIT, June 27—The Detroit Motor Appliance Co., this city, owner of patents of damper used on radiators on Hudson, Columbia and other cars, has increased its capital from $45,000 to $225,000.

—

PORT HURON, MICH., June 27—The Xylite Grease and Oil Co. closed a contract with Great Britain for oil and grease for automobile and airplane use.

# 37,482 Miles by Ajax Winner

## $500 Prize Goes to Brooklyn Man—No More Contests to Be Scheduled

NEW YORK, July 24—A record of 37,482 miles has been reached by the winner of the fourth and last annual tire mileage contest of the Ajax Rubber Co. The winner is Fred Weitzman, of Brooklyn, N. Y., first prize being $500. An average of 15,000 was made by the first fifty winners. The first eight averaged over 30,000 miles. Second prize of $300 was won by Joseph Schoenbaum, of New York, who negotiated 33,072 miles; third prize of $200 was won by W. F. Trueman, who went 29,393 miles.

This year's record compares with 27,220 last year, which was better than 5000 miles over the 1915 record.

This year's tire mileage contest will mark the end of these annual events, as the contests, which have been held for the past 4 years, have now served the purpose for which they were intended.

—

**Won Laurels in Tractor Demonstration**

LA CROSSE, WIS., July 21—Word has been received by the La Crosse Tractor Co. from its representative at the Western Canada Tractor Demonstration, held last week at Brandon, Man., that the Model B Happy Farmer tractor on July 19 finished first in competition with twenty-three tractors, plowing over an acre in 55 min. and handling a three bottom plow. A speed of 2 3.4 m.p.h. was maintained and the ground plowed 6½ in. deep. F. H. Oltman, the company's representative, wires that the tractor had plenty of reserve power and consumed 1¾ gal. of kerosene. The Happy Farmer tractor burns kerosene without water injection.

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**Oldfield Defeats DePalma**

PROVIDENCE, July 21—Oldfield won two out of three races from DePalma at the Narragansett Speedway to-day. Oldfield drove the Gold-Bug and DePalma the Packard 12.

The 25-mile race went to Oldfield in 22:54¾ and the 10-mile also in 8:14 1/5. DePalma took the 15-mile race in 13:51 3/5. Oldfield's time in the 10-mile race broke the track record of 9:02 1/5, made by DePalma in 1915 in the 100-mile sweepstakes event won by Rickenbacher.

—

**$30,000 for Termaat & Monahan Assets**

OSHKOSH, WIS., July 21—The offer of the reorganization committee of stockholders in the Termaat & Monahan Co., Oshkosh, Wis., manufacturing gasoline engines, machine tools and other machinery and parts, to pay $30,000 for the assets and assume all encumbrances, has been accepted by the circuit court. The property thereupon was conveyed to a new company, styled the Termaat & Monahan Mfg. Co., which was organized by the committee and since the latter part of June has been operating the works to some extent under a temporary lease. It is intended to re-open the entire plant immediately to handle a considerable number of orders and to accommodate much new business, which is being placed following the settlement of affairs. The value of the estate is estimated at more than $350,000.

—

**Receivers for Stungo Radium Rubber**

WASHINGTON, PA., July 20—Receivers to-day were appointed for the Stungo Radium Rubber Co. J. P. Braden and Joseph Stungo were named receivers. The company was organized in September, 1916, and was capitalized at $325,000. On July 1, 1917, it is claimed all of this had been dissipated except $150,000, and of this amount $130,000 was spent in promoting and organization, leaving $20,000 to finance and maintain the company.

—

**Pennsy Motor to Be Financed**

PITTSBURGH, July 19—At a meeting of stockholders of the Pennsy Motor Co. it was decided to raise sufficient funds to carry the concern over its present financial embarrassment.

W. G. Beckert, president of the board of directors, said that at least $5,000 must be raised at once. A. C. Ellis, secretary of the Pittsburgh Assn. of Credit Men, agreed to become president of the company if the money is raised. It is said the company has orders for several hundred cars, and that it has more than $20,000 worth of material on hand.

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**Disbrow Developing Armored Car**

ST. LOUIS, July 23—A high speed armored car is being developed by Louis Disbrow, president of the Disbrow Motors Corp. The vehicle has been inspected by army officials, and detailed reports of the design will be given out later. The corporation is now putting out a "Quad Express" which will seat four passengers and make a speed of 87 m.p.h.

—

**Kent Assets Valued at $216,819**

NEWARK, N. J., July 19—In a schedule of the Kent Motors Corp., presented to-day to the referee in bankruptcy by President F. H. Clarke, liabilities were stated as $26,272 and assets $216,819. Included in the latter was stock of the Kent Motors Co. of New Jersey, scheduled at $206,000.

—

**$500 for One Tire in Sweden**

STOCKHOLM, July 25—Sweden is becoming alarmed by the United States exports plan. The Washington dispatches of the last few days forecasting the sharpest limitation or possible discontinuance of all exports to neutrals has caused anxiety in Government circles. Leather is scarce and automobile tires bring $500 apiece.

# Personals

**C. R. Armbrust**, formerly assistant engineer of the Chandler Motor Car Co., has been appointed chief engineer of the H. J. Walker Co., which has started operations on the new four-story reinforced concrete building, 220 by 60 ft., as the first unit of a series of buildings to be erected within the coming year, which will increase the capacity of the present plant 200 per cent. The company now has a capacity of 150 complete sets of engines and axles per day.

—

**Edgar N. Dollin**, organizer and president of the Acme Die-Casting Corp., has sold his holdings in that company and is retiring from active management. Mr. Dollin was formerly secretary of the Doehler Die-Casting Co. and president of the Kalak Water Co.

—

**R. J. Doty**, for the last 3½ years in charge of the steel foundry of the Isaac Johnson Co., Spuyten Duyvil, N. Y., has severed his connections with that company to become associated with the Sivyer Steel Casting Co., Milwaukee, Wis.

—

**Jas. A. Braden**, advertising and publicity manager of the Standard Parts Co., Cleveland, has retired because of poor health. Braden was formerly advertising manager of the Diamond Tire Co.

—

**A. Craig Culbertson**, formerly sales manager of the Compression Inner Tube Co., has been appointed manager of the Quick Tire Service Co., which will be combined with the Louisville branch of the United States Tire Co. He succeeds Charles T. Ballard, Jr., now in the service of the United States Navy. Andrew Hunnicutt, for many years identified with the concern, is made assistant manager.

—

**A. Aprahamian**, vice-president of Keegan, Aprahamian & Co., New York, exporters' and manufacturers' agents, will sail this month to South Africa in the interests of the Mitchell Motors Co., Racine, Wis. He will also visit New Zealand, Australia, and the Far East, and will be away about a year.

—

**Elbert E. Martin**, assistant secretary of the Detroit Section, S. A. E., has resigned to become assistant manager and director of publicity of the Vanderbilt Hotel, New York. Martin is succeeded by C. C. Hope.

—

**A. W. Snyder**, Burlington, Wis., has gone to Milwaukee to organize a foundry and manufacturing company which will make a specialty of motor car parts and other light castings. A site has been purchased at Barclay Street and Greenfield Avenue, Milwaukee, upon which a new plant, 120 by 240 ft. in size and two stories high, will be erected immediately.

—

**H. J. Vogler** has been appointed Metropolitan wholesale manager of the Willys-Overland, Inc. He was formerly connected with the Maxwell Motor Co. as eastern supervisor.

—

**Bertram M. Wachtel**, formerly of Boston, Mass., is now connected with the Asbestos Woven Fibre Co., New York. Mr. Wachtel will return to Boston around Sept. 1 to look after the interests of the above company in the State of Massachusetts.

—

**J. K. Sinyard**, until recently a factory executive with the Nash Motors Co., has been appointed works manager for the Stegeman Motor Car Co., Milwaukee.

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**W. Port** has left the purchasing department of the Mitchell Motors Co. to become purchasing agent for the Stegeman Motor Car Co.

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**Arthur W. Ellis**, who for the past 6 years has been manager of the Louisville branch of the Goodyear Tire & Rubber Co., will leave Louisville next week for New York, where, effective Aug. 1, he becomes assistant manager of the New York City branch.

—

**M. P. Crowling** is appointed assistant purchasing agent for the Buick Motor Co., Flint, Mich. Crowling was formerly purchasing agent for the Illinois Steel Co., Chicago.

—

**Wm. A. Hart** has become assistant advertising manager of the Detroit Steel Products Co. Hart was formerly Western advertising manager of the Burroughs Adding Machine Co.

—

**Frank A. Witt**, formerly southern district sales manager for the Hupp Motor Co., has been appointed southern district manager by the Olympian Motors Co., Detroit.

—

**A. A. Crumley** has resigned as Eastern sales manager of the Chalmers Motor Car Co., Detroit, to become general manager of the Coombs Motor Co., Washington, D. C.

—

**P. C. Christman**, for the past 3 years district manager and sales engineer for the Burd Ring Sales Co., Rockford, Ill., has resigned and become vice-president and general manager of the Gill Piston Ring Co., 1864 Broadway, New York.

—

**C. A. Carey** has become director of sales and purchasing of the H. J. Walker Co., Cleveland, maker of engines and parts. Mr. Carey was formerly with the Chandler Motor Car Co. as purchasing agent.

**Carl L. O'Donnell** has been appointed district manager of the Olympian Motors Co., Pontiac, Mich., for the Ohio, Indiana and Michigan territory. Frank A. Witt, formerly Southern district sales manager of the Hupp Motor Co., has been appointed Southern district manager for the Olympian Motors Co.

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**Wm. A. Hart**, formerly in the advertising department of the Burroughs Adding Machine Co., has joined the advertising staff of the Detroit Steel Products Co. as assistant advertising manager.

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**C. H. Williams**, 304 South Vermillion Street, Streator, Ill., will shortly erect a new garage at that number, plans having been approved. Mr. Williams will be distributer for the Cadillac car and will also operate a clearing house for used cars. An accessory store will be conducted in connection.

—

**C. R. Day**, of Jackson, Mich., formerly with Buick, has also joined the selling forces of the Monroe Motor Co., and will cover western Michigan.

—

**V. H. Fletcher**, former designing engineer for the Harroun Motors Corp., has accepted a similar position with the Studebaker Corp., South Bend., Ind.

—

**C. G. Martin** has been placed in charge of the manufacturing department of the J. C. Wilson Co., Detroit, motor truck builder. Martin was formerly connected with the Federal Motor Truck Co.

—

**Edmund Dixon**, has been appointed general manager of the Saginaw Motor Car Co. to succeed L. J. Lampke. The latter has been granted an indefinite leave of absence preparatory to his entrance in the second officers' reserve camp at Fort Logan H. Root, Little Rock, Ark. Dixon was formerly connected with the Lewis Mfg. Co. of Bay City.

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### Ten Broeck Tyre President Dead

LOUISVILLE, KY., July 23—Harry L. Lewman, 51 years old, president of the Ten Broeck Tyre Co., manufacturer of the Ten Broeck tire, succumbed to a nervous breakdown and heart disease last Monday afternoon at the Pope Sanatorium. Mr. Lewman organized the Ten Broeck Tyre Co. about 5 years ago.

—

### Kalmes, Four-Wheel Drive Director, Dead

CLINTONVILLE, WIS., July 21—John Kalmes, one of the original stockholders and since its organization a director and officer of the Four-Wheel-Drive Auto Co., Clintonville, Wis., died after a short illness, aged 55 years.

# Factory

**Republic Motor Truck Co.**, Alma, Mich., has bought factory buildings and a 12 acre site in Los Angeles, and will establish an assembly plant. The buildings formerly were used by a planing mill company and are in first class condition. The main structure is of steel with concrete flooring. It is 275 by 450 ft. and there are two other buildings, one 75 by 150 ft. and the other 85 by 165. The first year's production, it is announced, will be 2000 trucks and 225 men will be provided employment at the start. It is intended to supply Pacific coast territory and overseas trade from the local plant.

—

**Mitchell Motors Corp.**, Racine, Wis., has purchased the plant of the Mitchell Wagon Co., Racine, which has disposed of all patterns, trade-marks, stocks, patents and good will to Deere & Co., Moline, Ill. The Mitchell Motors Co. will use the big wagon works for the manufacture of bodies and coach work. When the former Mitchell-Lewis Motor Co. was purchased by the present owners and re-named the Mitchell Motors Corp., the wagon department was organized separately. The wagon works, however, manufactured some Mitchell bodies for the parent company. The increase in production of cars made it advisable to take over the entire plant and abandon the wagon-making business, it is stated.

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**California Aviation Co.**, Los Angeles, recently incorporated with a capital of $600,000, is planning for the immediate operation of a plant for the manufacture of airplanes. The company has acquired property at Vernon and will specialize during the coming months in the production of training machines for Government service and training schools. The present capacity will be one finished machine a day, to be increased to about ten with the installation of proposed machinery.

—

**Maxwell Motor Co.** will erect a new factory, two stories, 100 x 300, at McDougall Street and Tecumseh Road, Windsor, Ont., to cost $150,000. It will be used to build automobiles for the Canadian and British Empire trade.

—

**Standard Roller Bearing Co.**, Philadelphia, has opened a branch house of the service sales department in Boston, which will be the headquarters in the New England territory for all its products. This is the first of a series of branch houses of the service sales department which will be opened in the near future in approximately fifteen or twenty of the leading cities of the United States.

—

**Bearings Service Co.** will open six new branches Sept. 1 at Pittsburgh, St. Louis, Omaha, Portland, Ore., New Orleans and Toronto. These new branches will be in charge of C. M. Fox, C. R. Jones, W. C. L. Hodgson, R. H. Cross, W. R. Herring and A. W. Robbins, Jr., respectively. The company has now established during the first year of its operation twenty-two branches. The Bearings Service Co. is the authorized national service representative for the Hyatt Roller Bearing Co., the Timken Roller Bearing Co. and the New Departure Mfg. Co.

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**Twin Six Corp.**, of Milwaukee, manufacturer of wheels for Ford trucks with shock absorbers attached, is negotiating for the location of a factory at Logansport, Ind. The company is capitalized at $1,000,000, and is said to be seeking a location where it may expand production.

—

**Remy Bros. Tractor Co.**, Kokomo, Ind., which recently was incorporated with a capitalization of $500,000, has leased the plant of the Kokomo Foundry & Machine Co. for a period of 2 years with an option of 2 additional years. Work was started a few days ago on remodeling the plant. The company expects to manufacture about thirty tractors this year, but expects to begin operations on a large scale in 1918.

—

**Pan-American Motor Co.**, Decatur, Ill., will build commercial vehicles, due to the demand on account of the war. C. V. Morse, vice-president of the company, believes that this department should be given as much attention as automobiles. The engineers of the company are now working upon plans for two trucks of 1 and 2-ton capacity. The company has purchased a large building, formerly occupied by the Decatur Fountain Co., and will also construct another building, 134 by 200. When all of the structures planned for the company are ready, there will be a total frontage of 600 ft. A carload of Timken axles and sixty engines was received this week, making it possible to start the actual assembling of cars. Much of the machinery recently purchased is now in position.

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**Shadburn Automobile Co.**, Frankfort, Ind., is nearly ready to start manufacturing cars. Twenty-two carloads of engines, bodies, radiators and other equipment are soon to be unloaded. Twelve carloads of the material arrived last week, and the balance is expected this week. As soon as the material can be unloaded, a force of men will be put to work and increased as the work progresses. It is the plan to have a full force at work by fall.

—

**Moore Motor Vehicle Co.**, Minneapolis, Minn., is to move to Danville, Ill., the new plant being at Oaklawn. The buildings formerly occupied by the Danville Car Company, now defunct, have been leased for the manufacture of cars and farm tractors. The company will open the plant with 100 men, and parts of 100 cars have been received for assembling. A large quantity of old material, much of it iron, will be sold as junk, the value of this salvage being very heavy since the war opened. A second shipment of parts is on the way and is expected next week. One of the buildings will be devoted exclusively to the manufacture of car bodies and machinery has been ordered for their construction.

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**L. W. F. Mfg. Co.**, College Point, L. I., will establish a branch factory at Long Island City for the manufacture of biplanes.

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**General Vehicle Co.**, a subsidiary of the Peerless Truck & Motor Corp., has completed and shipped the last of its 200 Monosoupape Gnome engines, built for the British admiralty.

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**Perlman Rim Co.'s** New York offices have been moved to Jackson, Mich., and that part of the machinery of the Perlman Rim Co. that was in the Mott Wheel Works, Utica, N. Y., is being transferred to the Jackson plant. It is expected that additional workmen will be hired.

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**Bound Brook Oil-less Bearing Co.'s** new foundry being erected at plant No. 2, Lincoln, N. J., which is 2 miles east of the Bound Brook plant, will be ready for occupancy Aug. 3. This building is of steel and brick construction, 60 by 180.

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**Cleveland Motor Plow Co.**, Cleveland, is having plans prepared for a plant in East Cleveland at a cost of about $300,000.

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**Packard Motor Car Co.**, Detroit, is employing at present about 500 negro laborers in its plant, and more are being taken on daily. These men are not displacing the white labor. The white men are advanced to better positions due to the increased volume of work. Negroes are coming into Detroit in great numbers to fulfill the labor requirements. It is estimated that Detroit's negro population has been increased 10,000 in the last year.

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**Turbo Carburetor Co.**, Milwaukee, organized 6 months ago by I. M. Smith and others, has completed the equipment of a foundry and machine shop at 150 Clinton Street and is manufacturing carbureters.

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**Hayes Motor Truck Wheel Co.**, St. Johns, Mich., is using women help for the first time. At present fourteen women are employed—one running an elevator, four on machine work, and the rest are in the spoke department grad-

ing spokes. At the start the pay is 20 cents per hour; this is advanced to equal a man's pay for equal amounts of work, though under the law they may only work 54 hours a week.

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**Harvard Electric Co.**, Chicago, is manufacturing a pocket battery meter, being 2¼ in. in diameter, ⅝ in. thick and 4 ounces heavy.

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**Delion Tire & Rubber Co.**, Trenton, N. J., will build two additions to its plant on East State Street.

—

**Gary Motor Truck Co.**, Gary, Ind., is installing machinery and will soon begin operations in its new plant with about 50 men. The company started in a temporary plant at Hobart over a year ago.

—

**Sivyer Steel Casting Co.**, Milwaukee, Wis., is enlarging its plant and installing an additional 3-ton electric furnace to take care of its growing business with the truck, tractor and general machinery makers.

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**North American Motors Co.** plant at Pottstown, Pa., is expected to be ready for occupancy in September.

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**Park Drop Forge Co.**, Cleveland, shipped 48,324 counter balanced crankshafts up to July 20.

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**Frost Gear & Forge Co.** has purchased for $26,509.57 the factory property of the American Top Co., Jackson, Mich., from L. S. Bisbee, United States Commissioner, trustee.

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**Globe Seamless Steel Tubes Co.**, Milwaukee, will build a curing and cooling room, 50 by 480 ft. in size, as an addition to the big plant at 37th Avenue and Burnham Street.

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**Republic Motor Truck Co.**, Alma, Mich., held its first of a series of factory conventions during the week of July 16-21, when 200 dealers assembled. With more than 900 dealers, covering every State, it was deemed better to hold the meetings in sections.

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**Hobbs Storage Battery Co.**, Los Angeles, Cal., has acquired a two-story building at 1231-35 South Olive Street, and will manufacture a special storage battery.

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**White Automobile Co.**, Cleveland, has started excavations for a $300,000 addition to its factory. The building is to be 125 by 500 ft., concrete and steel construction, part one-story and part two-story, with a basement.

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**Clark Equipment Co.**, Buchanon, Mich., has started a factory addition, 36 by 120 ft., brick and steel construction. This company makes steel truck wheels, such as are used on army trucks by the Allies.

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**Jacob Weber's Sons**, Louisville, have completed an addition to their wagon and motor truck plant, and contemplate further additions.

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**National Cash Register Co.**, Dayton, has received a large order for airplane parts, and it is expected that by Sept. 1 about 6000 workers will be employed. It is possible that the Domestic Engineering Co. plant at Moraine City will be utilized by the N. C. R. for manufacturing complete airplanes.

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**Advance Auto Sheet Metal Works** has opened a factory in Jackson, Mich., for the purpose of manufacturing automobile sheet metal work.

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**Olds Motor Works**, Lansing, Mich., has broken ground for a two-story, 80 by 400-ft. addition containing 60,000 sq. ft.

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**Ideal Tire & Rubber Co.**, Cleveland, has awarded contracts for the erection of a $150,000 factory building.

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**Electric Equipment Co.**, Los Angeles, has taken over the entire distribution of USL storage batteries for seven western states, which include California, Washington, Oregon, Idaho, Utah, Nevada and Arizona.

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**Maxwell Motor Sales Corp.** of Detroit closed contracts with distributers and dealers for the handling of 75,000 automobiles within 2 weeks after starting making its annual contracts July 1.

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**General Motors Co.** truck plant addition in Pontiac, Mich., 400 by 80 ft. has been completed in record time. The concrete and steel building was erected in forty actual working days, with no overtime. It will be used for testing purposes.

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**United Motors Co.**, Grand Rapids, Mich., will build a 6-ton road tractor. The company is completing an addition to its plant which will be devoted to the building of tractors. The present schedule of production is 200 a month.

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**C. R. Wilson Body Co.** plans an addition to the Detroit plant for the purpose of increasing the facilities of the metal working department; the addition to cost $175,000. The Bay City plant, now building, will be in operation Aug. 1.

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**Triangle Truck Co.**, St. Johns, Mich., has started work on its new plant east of this city, and it is expected to be in operation Nov. 1. The building is one story, brick, fire-proof construction, 70 by 236 ft The company will manufacture 1 and 1½-ton trucks, and will have forty men on its initial pay-roll.

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### PRODUCTION

COLUMBUS, OHIO, July 20—With orders on hand for 4400 cars and the present equipment turning out nine cars a week, the Monitor Motor Car Co. has been increasing the capacity of the plant so that by Sept. 1 it will be doubling its present output. Plans are already under way for building a new modernly-equipped factory to care for its growing business. A stock selling campaign conducted by the company for 1 week proved exceedingly successful.

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LANSING, MICH., July 17—The present production of the Olds Motor Works is 125 cars daily. Contracts for the erection of an $80,000 factory were let last week and a second building is contemplated. The building being erected will be completed under 90 days. The labor situation in Lansing is at present much better, as sufficient men are available from Detroit.

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### Rippingill on Aircraft Work

DETROIT, July 25—E. V. Rippingill, assistant sales manager of the Hudson company, is in Washington assisting in the production end of aircraft work.

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## Airplane Bill Now Law

(*Continued from page* 164.)

"The design and construction of jigs, tools and gages will require weeks, and even months of time, no matter how rapidly we work. It must be remembered, therefore, that a few months will necessarily elapse before the outward results of our industrial effort will show in the shape of quantities of finished fighting machines. We cannot get aircraft merely by 'shaking the trees'. It can be announced, however, that most gratifying progress on this preliminary organization already has been made during the past few weeks, and if it progresses in the future at the stride that has been developed there need be no fear as to America's position in the aircraft field by next summer.

"The difficulties which apply to the production of high-powered machines for fighting and bombing purposes fortunately do not apply with equal force to the training program, and within a comparatively short time we shall have enough of the type required for training the thousands of men who will constitute a contribution to the winning of the war equal in importance to the production of machines. America is the last great reservoir of material for war pilots, as well as, for airplanes. Already three of the twenty-four big new training fields are completed and instruction on them has begun. Others are being rushed to completion. Orders for training machines were placed weeks ago and shipments of the first output already have been made. The output of this most necessary type will continue to increase rapidly, as we already have plants experienced in their manufacture.

"In considering the size of the appropriation, it must be borne in mind that less than half this amount is to be expended in the purchase of airplanes alone. Personnel, training equipment, over-seas maintenance, spare parts, flying stations, armament and scientific apparatus, all are to be provided for and are equally as important as the manufacture of the machines. One hundred and ten thousand officers and enlisted men—an army of the air greater than our standing army of a few months ago—will be needed. The whole project is one which appeals to the imagination of our people and to the genius of our American engineers."

## Companies Represented at Army Truck Meeting in Columbus

(*Continued from page* 140)

Nash Motors Co., G. W. Smith.
National Car Co., E. L. McMillan.
New Departure Mfg. Co., F. W. Marschner, S. B. Dusinberre, F. G. Hughes.
New England Truck Co., E. G. Moulti.
Norma Co. of America, Geo. R. Bott.
North East Electric Co., W. H. Hutchins.
Packard Motor Car Co., Alvan Macauley, H. D. Church, H. B. Knap.
Parish & Bingham, C. W. Hatch.
Penn. Spring Works, P. A. Hopkins.
Perfection Spring Co., W. E. Dunston, R. A. Townsend.
Pfanstiehl Co., A. O. Dady.
Pierce-Arrow Co., W. J. Foss, G. M. Graham.
Pouvailsmith Corp., G. E. Smith.
Remy Electric Co., F. C. Kroeger, G. V. McMahon.
Republic Motor Truck Co., F. W. Ruggles.
Rowe Motor Mfg. Co., Samuel S. Rowe.
Rowland Inc., Wm. & Harvey, W. M. Newkirk.
S. A. E., J. G. Utz.
S. K. F. Ball Bearing Co., C. R. Mabley, Geo. C. McKay.
Savage Arms Corp., C. H. Smith.
Sayers & Scovill Co., Emil E. Hess.
Service Motor Truck Co., Charles Guernsey, M. C. Cook.
Sheldon Axle Co., Arthur M. Laycock, R. A. Schaaf.
Sparks-Withington Co., Ray B. Weeks, Geo. A. White.
Spicer Mfg. Co., C. W. Spicer.
Splitdorf Co., A. D. T. Libby, W. J. Hart.
Standard Parts Co., W. C. Keys, D. K. Moore.
Standard Steel Casting Co., F. Still, E. H. James.
Standard Steel Spring Co., D. T. Gleason.
Stegeman Motor Car Co., L. A. Scherti.
Sterling Motor Truck Co., Arthur C. Wollensak, E. M. Stromberg.
Stewart Motor Corp., P. G. Stewart.
Studebaker Corp., Vincent Link, H. T. Myers.
Taylor Motor Truck Co., R. E. Taylor, Robt. J. Willoughby.
Thomas & Thomas, W. Owen Thomas.
Tide Water Oil Co., G. W. Stratford.
Timken-Detroit Axle Co., G. W. Carlson, C. E. Gordon.
Timken Roller Bearing Co., T. G. Buckwalter.
Torbensen Axle Co., Viggo V. Torbensen.
United Motors Co., E. A. Bedford.
U. S. Ball Bearing Co., O. Bruenauer, H. L. Spohn.
U. S. Govt. Q. M. Dept., Wm. M. Britton.
U. S. Motor Truck Co., F. J. Alvin, E. C. Shumard
Velie Motors Corp., Geo. E. Marton, C. B. Rore.
Vesta Accumulator Co., F. S. Armstrong.
Wagner Elec. Co., A. H. Timmerman.
Warner Gear Co., S. O. White, R. P. Johnson.
Waukesha Motor Co., S. W. Perkins, H. L. Honing, J. B. Fisher.
Westinghouse Elec. Co., G. H. Lewis, J. M. Hipple, C. E. Wilson.
White Motor Car Co., A. J. Scaife.
Willard Storage Battery Co., P. J. Nightingale, G. R. Cook.
Wilson Co., J. C., Glenn A. Freeman.
Willys-Overland Co., E. W. McKinley, Edwin B. Jackson.
Winther Motor Truck Co., M. P. Winther.

# Calendar

### ASSOCIATIONS

Aug. 6-10—Convention at Atlantic City under auspices of Cycle Parts and Accessories Assn.
Sept. 12-14—Atlantic City, N. J., Motor and Accessory Manufacturers, Mid-Season Meeting.
Sept. 25-28—Pittsburgh National Assn. of Purchasing Agents, Convention.

### CONTESTS

July 29-Great Falls, Mont., Track Race.
Aug. 5—Billings, Mont., Track Race.
Aug. 17—Flemington, N. J., Track Race.
Sept. 3—Uniontown, Pa., Speedway Race.
Sept. 3—Cincinnati, O., Speedway Race, Championship.
Sept. 6—Red Bank, N. J., Track Race.
Sept. 8—Hillclimb, Pike's Peak, for stripped stock chassis.
Sept. 15—Providence, R. I., Speedway Race, Championship.
Sept. 22—Allentown, Pa., Track Race.
Sept. 28—Trenton, N. J., Track Race.
Sept. 29—New York Speedway Race, Championship.
Oct. 6—Danbury, Conn., Track Race.
Oct. 6—Uniontown, Pa., Speedway Race.
Oct. 13—Richmond, Va., Track Race.
Oct. 13—Chicago Speedway Race, Championship.
Oct. 27—New York Speedway Race.

### S. A. E.

Aug. 6—Motorcycle Division, Atlantic City.

### SHOWS

Aug. 6-10—Fremont, Neb., General Tractor Demonstration.
Sept. 2-9—Spokane, Wash., Interstate Fair.
Sept. 9-15—Milwaukee Show, State Park Fair, West Allis.
Sept. 9-15—Milwaukee, Wis., Fall Show, Wisconsin State Fair, West Allis, Milwaukee Automobile Dealers.
Oct. 13-28—Dallas, Tex., Dallas Automobile & Accessory Dealers Assn. State Fair.

### 1918

Jan. 5-12—New York Show, Grand Central Palace, National Automobile Chamber of Commerce.
Jan. 19-26—New York, Motor Boat Show, Grand Central Palace, National Assn. of Engine and Boat Manufacturers.

# Engineering

American Railway Master Mechanics' Assn.
American Institute of Electrical Engineers.
Master Builders' Assn.
American Society of Heating and Ventilating Engineers.
Association Iron and Steel Electrical Engineers.
Mining and Metallurgical Society of America.
Society of Automotive Engineers.
Illuminating Engineering Society.
National Electric Light Assn.
National Gas Engine Assn.
American Society for Testing Materials.
American Institute of Metals.
American Foundrymen's Assn.
Society Naval Architects and Marine Engineers.

### AUGUST

4—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
11—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
20—Amer. Soc. Heat & Vent. Engrs. monthly meeting New York section.
21—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

### SEPTEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10-14—Assn. Iron & Steel Elec. Engrs. annual convention at Phila.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
20—Mining & Met. Soc. of Amer. monthly meeting N. Y. section at Engrs. Club.
24—Amer. Inst. Metals at Boston.
24—Amer. Fdry. Assn. annual meeting at Boston.

### OCTOBER

6—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.
13—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
15—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
17-18-19—Amer. Gas Inst. at Washington, D. C.
18—Mining & Met. Soc. Amer. monthly meeting New York section Engrs. Club.
20—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

### NOVEMBER

3—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penna. section at Phila.
9—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
10—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
12—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mass. section at Boston.
15—Mining & Met. Soc. Amer monthly meeting New York section at Engrs. Club.
15-16—Soc. Naval Arch. & Marine Engrs. annual meeting.
17—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
19—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

### DECEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.
11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.
13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn section at Phila.
14—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.
15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.
20—Mining & Met. Soc. Amer. monthly meeting New York section at Engrs. Club.